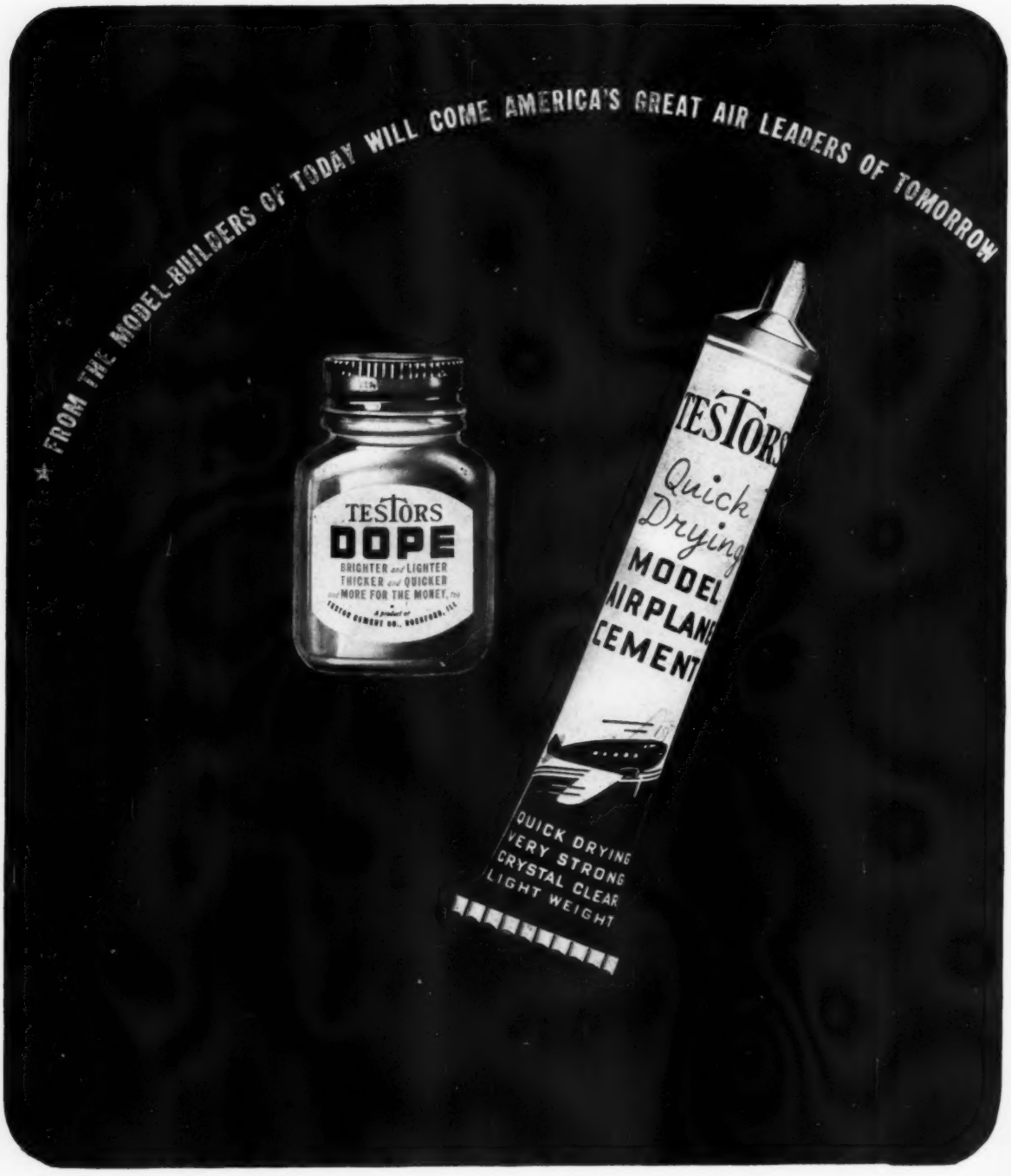
MODEL AIRPLANE NEWS

NOVEMBER 1942 • 20 CENTS

FOCKE-WULF 190 FIGHTER



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FLASH NEWS

Special to MODEL AIRPLANE NEWS

BIGGEST news for the United States Army Air Forces was occasioned on August 20 when the first Nazi plane went down under the guns of a U.S.A.A.F. pilot. An eager and rightful claimant for this signal honor was 23-year-old Captain Frank K. Hill Jr. of Hillsdale, New Jersey. In the smouldering skies over Dieppe, puckish Captain Hill caught a Focke-Wulf Fw-190 (see page 23) squarely in his sights, sent it crashing to earth and thereby gained a fame approaching immortality. Back at his home base in England, nervously excited Frank Hill modestly claimed a "probable" victory for he had not actually seen it hit the ground.

One monkey-wrench marred the perfection of Captain Frank Hill's "first": he was flying a British designed and built Spitfire fighter, thereby wrecking the "All-American" aspects of his honor. And there is every possibility that all American fighter pilots will gain their initial and subsequent victories in this British fighter.

Why? This remains one of the most bitterly argued questions in flying circles on both sides of the Atlantic with no very good reason being agreed upon. Some seem sound: the Spitfire mounts four 20 mm. cannon firing high explosive shells whereas no Yank fighter carries such an array of hitting power. Others seem fantastic: the Spitfire is "faster," "more maneuverable," has seen more action. Most logical explanation seems to be the fact that there is no very good reason why American pilots should NOT fly Spitfires. They are plentiful, the ground crews are experienced with them, a flow of spare parts is always available, they are, in every respect, on a par with the latest production models of the Bell Airacobra P-39, the Lockheed P-38 and the North American Mustang P-51, and they are familiar sights to the British A-A gunners, plane spotters and officers of R.A.F. squadrons in the air. And this last item is of no little importance, for A-A batteries are now in the habit of shooting first and investigating later.

Henry Kaiser's selling job, which was met with loud and long debate and objections, suddenly jelled with the announcement that Howard Hughes had joined him in the project to build 500 giant cargo planes. On the heels of this announcement came a significant silence from Kaiser's critics and endorsement of his program from Washington. Reason: few, who know, doubt the complete success of the undertaking now that Hughes is in on it 50-50. Howard Hughes, one of the richest men in America but no playboy by a long shot, has established himself as one of the leading aeronautical figures in the nation; holding this distinction by virtue of his present 'round-the-world record, his trans-continental speed record, the world's landplane speed record, which he once held, and his collaboration on the design of Lockheed's new giant transport plane soon to appear.

Hughes' aircraft factory near Los Angeles, boasts a large engineering staff, a complete shop and one of the world's longest runways; undoubtedly this group will serve as the nucleus of the giant organization necessary to bring the Kaiser plan to a successful conclusion. Some doubt exists as to the cargo ship that will be built. Naturally it will be a flyingboat and the huge Martin Mars has been discussed but no definite plans have been made for mass production of this ship as such. Perhaps it will be an entirely new design and Hughes has spoken of a vast plastic airplane which we will await with slight misgivings as "plastics" have been used successfully on lightly loaded structures and even on small training planes but it appears unlikely that a successful airplane of the 70-ton gross weight mentioned by the Hughes-Kaiser combine could be built in the present state of the art.

The Navy recently announced the commissioning of a new aircraft carrier and launching of a second. These two carriers are certainly not to be confused with

(Continued on page 59)

USS Wolverine, first aircraft carrier on the Great Lakes. Formerly the steamer Seeandbee, it now will be used for training (Acme)

14TH YEAR OF PUBLICATION

MODEL AIRPLANE NEWS

NOVEMBER, 1942 Vol. XXVII, No. 5

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Edited by
Charles Hampson Grant

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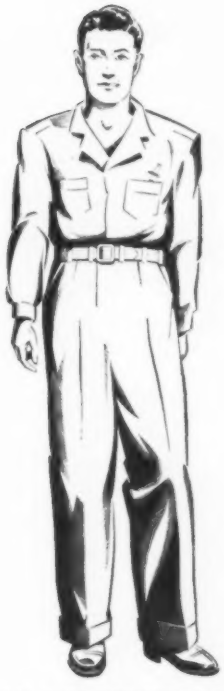

Aviation has JOBS for thousands, but CAREERS only for trained men!

Aviation executives face tremendous organization problems in the production of 185,000 warplanes. They have been forced to accept thousands of single-phase workers from cheap "quickie" courses, but the vital supervisory positions that bridge the gap between raw material and fighting ships can only be filled by men thoroughly trained to solve any problem assigned to them. The career man with long-range training is the ESSENTIAL unit of production . . . and ONLY he will continue to be essential through the readjustments that must follow when America's war production shifts back to peace-time schedules.

The executives who have made aviation THEIR career know that the value of each man is governed by two factors: his intelligent sincerity in selecting aviation as his life work, and THE ABILITY AND EXPERIENCE OF THOSE WHO TRAIN HIM FOR THAT CAREER. They know that Curtiss-Wright Technical Institute graduates are — and for many years have been — thoroughly qualified to fill the industry's exacting requirements.

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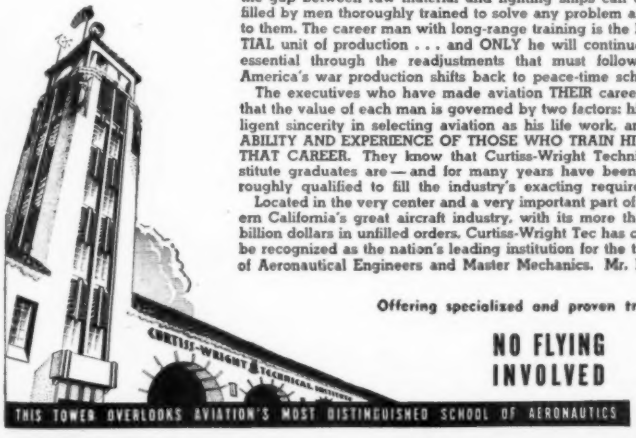

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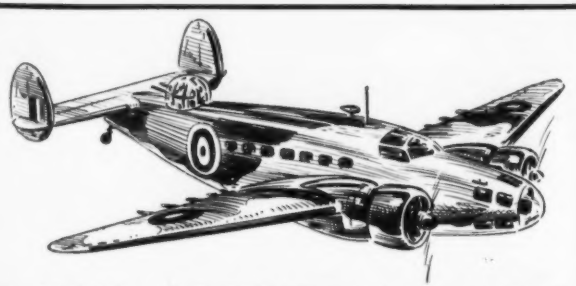
Writes S. L. K. of Chanute Field

He Says: "I am attending the Squadron Engineering Officers School, and studying planes of every type. Since joining, I have found the true value of my modelbuilding. Not only am I familiar with various plane types; I am familiar with plane structures, their functions, general construction, and so forth. I seriously believe that my training while building model aircraft has been worth at least one year's college study in aeronautical engineering."



Build the LOCKHEED "HUDSON" BOMBER (above) and these other 15 authentic CLEVELAND-DESIGNED MODELS of World War II Planes (at right)

These designs (in kit form) embody an amazing amount of "nowhere else procurable" authentic detail—typical of Cleveland's 23 years of painstaking research to produce the finest models possible—magnificently suited for educational purposes. Such features as easily-built Retractable Landing Gear, Surface Radiators, Exposed Superchargers, Detailed Machine Guns, Cannons, Bombs, etc.—all expected visible details—are standard with all Cleveland-Designed (C-D) Master Models. Each model is like a miniature course in full-size aircraft construction.

ROOKIE AMAZES OLD TIMERS

"I am a control tower operator at this very busy field. My job requires that I be able to recognize, almost instantaneously, any type aircraft used by the Army. I can only say that without ever having built model airplanes I would be lost, and I would require many months to become proficient at a task at which I am now good. I am new at the work, and the older fellows seem quite amazed that a rookie with only seven months army service can recognize all these plane types. I feel safe in saying that I wouldn't trade my model building experience for any money that might be offered. I think Cleveland is doing a marvelous job in training the young men of the United States in this time which almost necessitates model building experience. I've built your models, and I know." (From an operator in an Army Flying School in Texas.)

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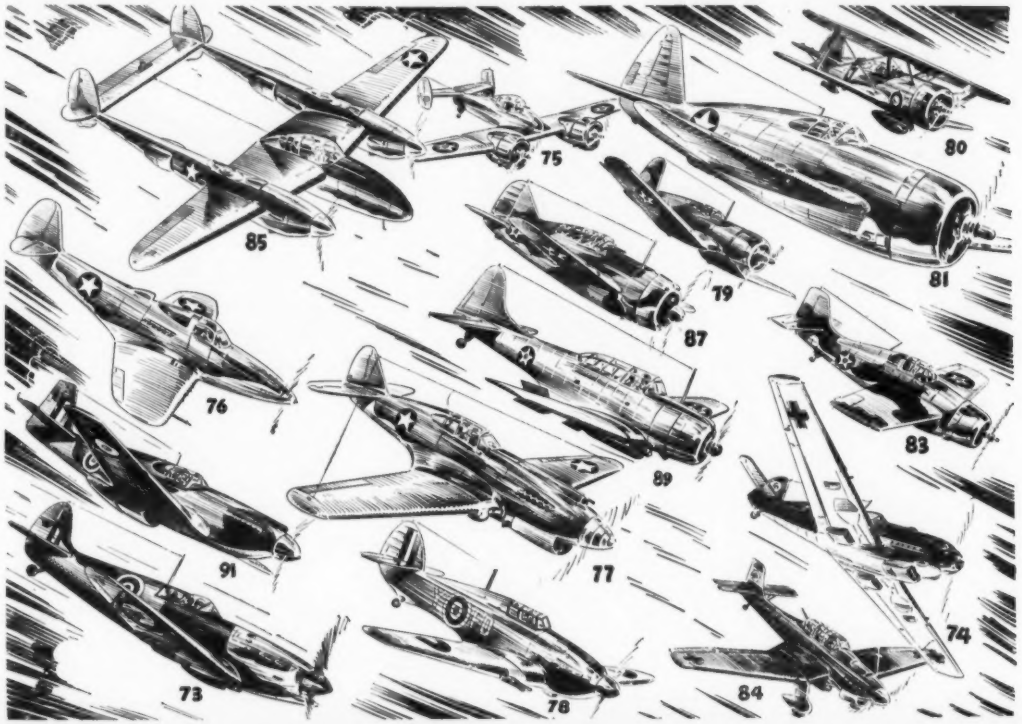
91—North American "MUSTANG" ("APACHE") Fighter. 27 3/16" 3.00



91—North American "MUSTANG" ("APACHE") Fighter. 27 3/16" 3.00

95—Lockheed "HUDSON" Bomber (shown at top). Widely used by crack American and Allied pilots out over the Pacific. Span 49 3/8" . . $7.50

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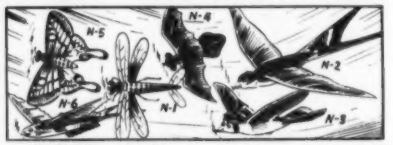

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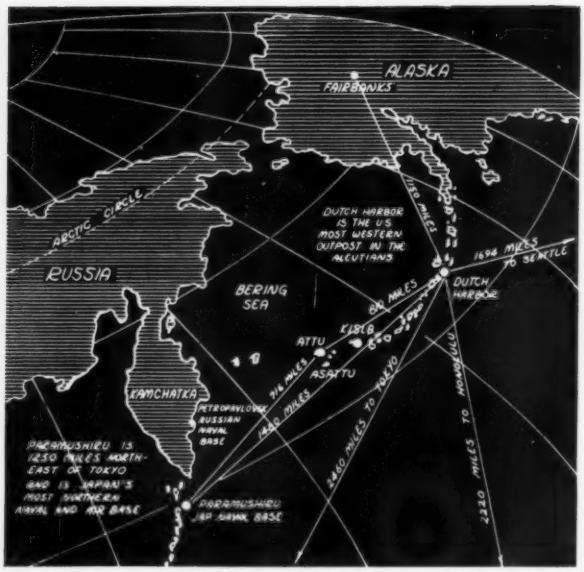

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SWORD OF DAMOCLES

Why the United States must control the Aleutian Islands and Alaska—stepping stones between Asia and America

by ROBERT McLARREN

Acme

THE Battle of the Pacific has divided itself into two distinct strategic spheres, each a complete sea-air battleground. The South Pacific has for these many months figured largely in the news as the pathway of Japanese conquest, and we have previously discussed some elements of this region. However, the Battle of the North Pacific or, more exactly, the Attack upon America, has begun with the landing of Japanese forces on the islands of Attu and Kiska,

(Top of page, right) Standing in front of an old Army DH-4 is the late General "Billy" Mitchell, center, who prophesied the dominance of air power twenty years ago and who also said, *"The nation that holds Alaska rules the world."* He also advocated a combined airforce with one responsible man at its head, believing that it then would be free from the control of men with old worn-out ideas. (Above) Canadian Airforce Cadets in Avro Anson bombers training over the Rockies for Alaska patrol. (Below) Left, dive bombers ready for action on the deck of a carrier. Right, cruiser New Orleans patrols the Alaskan coast under the shadow of snow-capped mountains.

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following two Japanese raids on Dutch Harbor at Unalaska.

Alaska generally, and the Aleutian Islands in particular, hold the answer to America's fate in the North Pacific, possibly in the Pacific Sphere as a whole, for here it may be that the determined Japanese onslaught will originate and advance. In effect it has already begun and our Alaskan Frontier is mustering its strength for a continuation of enemy movements with considerably renewed vigor, vitality and force.

Since, as we have continually pointed out, this is an *air war* in every sense of the word, it becomes important to consider the strategic geography of the North Pacific as a battleground of air power.

Alaska, with its seemingly endless chain of Aleutian Islands, hangs like a giant Sword of Damocles over the entire Pacific Ocean; but these same islands stretch like conveniently-placed stepping stones between an Asiatic power and America.

Japan's intent seems reasonably clear: to smash the military and naval threat of the South Pacific insular powers and then follow one of two courses—either attack India and attempt to join hands with Hitler's pincer across the Suez (thus neatly isolating the world's largest continent and snapping shut its jaws on beleaguered Russia and China); or attack America and attempt to crush its military might as a threat against the Axis. As this is written, Japan pauses. Can this be to debate the two courses?

None can doubt that Japan intends to attack America, either immediately or in due time; whichever her military and naval resources and exigencies of warfare dictate. Her landings on Attu and Kiska are, for the time being, scouting parties. But should their foothold be strengthened sufficiently, these landings are but a beginning.

And she has taken these steps for the prime purpose of securing air bases for a preparatory aerial assault on the great Northwest. The typical Japanese bombing plane (i.e. the Nakajima Type 19, described fully in the March 1942 issue of MODEL AIRPLANE NEWS) has an effective range of approximately 1,200 miles with a load of 4,000 pounds of bombs. The Alaskan Peninsula is just 1,200 mi. from San Francisco, obviously within easy bombing range. Vital aircraft manufacturing is just 2,200 mi. from Dutch Harbor, or within striking range of a suicide bombardment squadron who would utilize the full 2,400 mile bombers range in an all-out attack with no hope of return.

The known strength of the Japanese aircraft carrier fleet consisted at the start of the war of nine vessels. Known loss is the mighty Ryukaku, sunk during the Battle of the Coral Sea; and probably lost are the Kaga and Akagi. Although its complement of planes was little more than half that of a comparable numerical fleet of U.S. carriers, the Japs have depended heavily on their carrier fleet in their bid for Pacific victory. Although reports cannot at this early date be accurately correlated, it would appear that for the time being the threat of a carrier-based bombardment attack on the West Coast has been greatly lessened. By holding a major portion of its fleet in the South Pacific, and

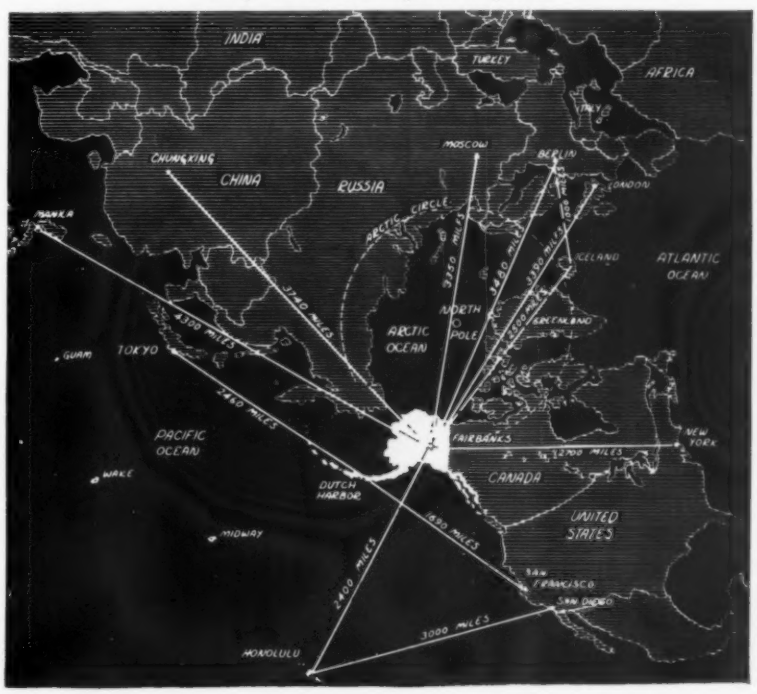
(Continued on page 38)

Intern'l

Intern'l

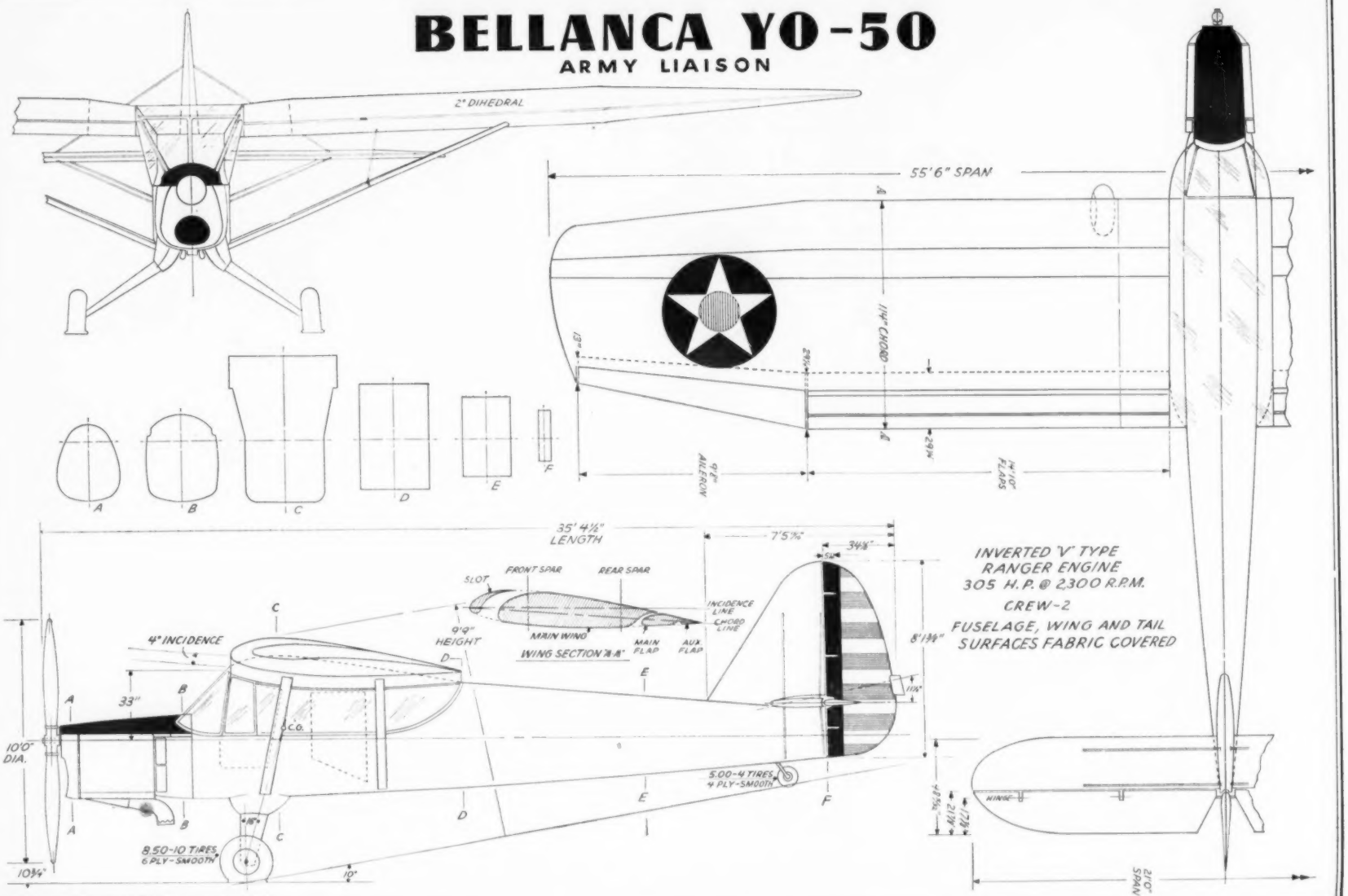
Intern'l

(Top) Latest production model of the Army P-39, Airacobra, which has been combatting the Japs in the Aleutians. (Center) An American carrier at Midway puts up a screen of fire; a Jap plane has just sunk beneath the waves where column of smoke rises. (Above) Jap carrier Ryukaku burns and sinks in the Coral Sea. Carriers are always vulnerable to superior air power.



BELLANCA YO-50

ARMY LIAISON



DRAWN BY CHARLES WERTMAN

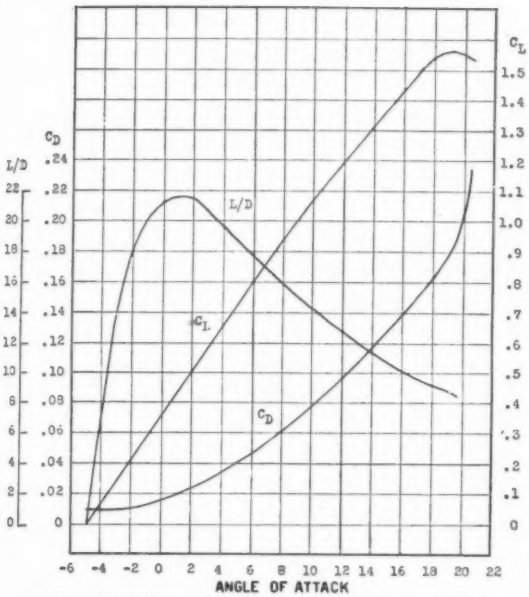


FIG. 1 CHARACTERISTICS OF CLARK Y AIRFOIL ASPECT RATIO 6.

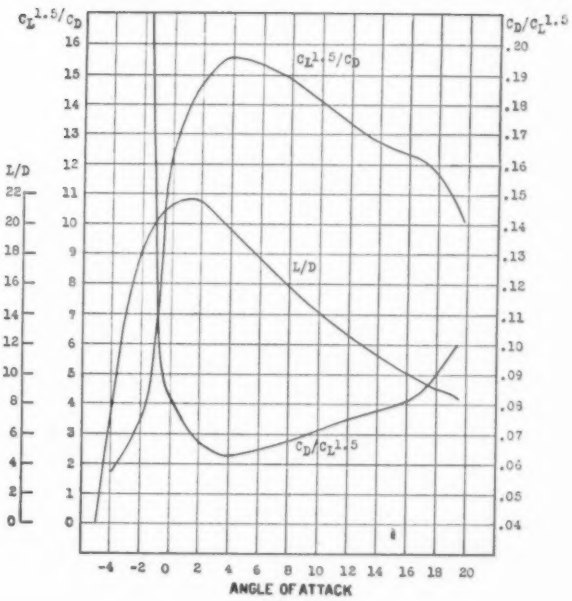


FIG. 3

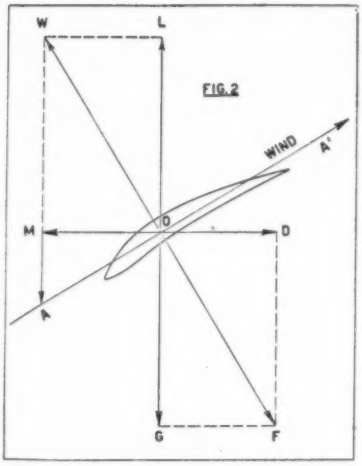


FIG. 2

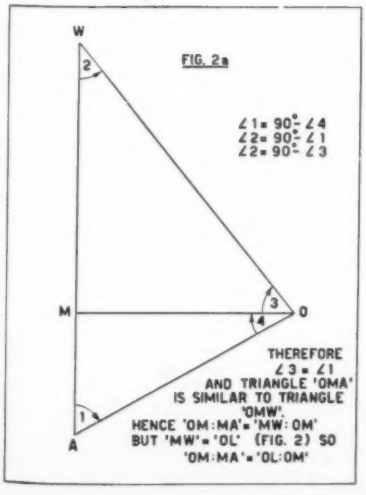


FIG. 2a

∠1 = 90° - ∠4
∠2 = 90° - ∠1
∠2 = 90° - ∠3

WHAT'S THE GLIDE?

The difference between glide and sinking speed and how they affect performance.

by JAMES R. CUSTIN

THE other day one of my friends remarked that the Airacobra, with its terrific speed, must have a glide like a brick. "No," I said, "I think it has a very flat glide. After all, look at its clean lines. There isn't much drag there."

"That's exactly what I mean," he said. "She must come down plenty fast."

And so we were off again on a battle which goes on forever among model builders and flyers.

The question of glide and gliding angle, together with the related problems of adjustment and performance, is a confusing one. It is difficult to explain, and difficult to understand. Yet it is well worth the effort required to gain a complete understanding of it, since 75% to 95% of the performance of a model airplane depends upon its glide.

Of course, there will be a little mathematics involved in the explanation. It seems as if there always is, whenever somebody starts to talk about aerodynamics.

But none of it is very difficult math. Furthermore, this article has been arranged so that you can take your math or leave it alone. If it's just plain facts you're looking for, skip over the sections labeled *Math* and read only the paragraphs labeled *Facts*. You will then get a connected story, without mathematical proofs. Of course, the section on performance calculation necessarily includes some simple arithmetic, but we feel that it's the easiest method of calculating performance ever devised—and therefore the best.

Now that we have that all cleared up, let's start right in with some

Facts. Let us consider first a typical airfoil section characteristics chart, such as the one shown in Fig. 1. This one represents the aerodynamic characteristics of the Clark Y airfoil, widely used by modelers. It shows the most important airfoil characteristics for a wide range of variations in angle of attack.

These characteristics are lift, drag, and ratio of lift to drag at each angle of attack. As a rule such graphs also show the center of pressure travel with change in angle of attack, but we have omitted this on our chart for the sake of simplicity.

It will be noticed that lift and drag characteristics are presented in the form of coefficients. Individually these tell us nothing, but when compared with one another they give us a pretty good idea of what is going on. The coefficients are useful, too, for calculating the actual characteristics of a given wing. In order to do this, the coefficient for the angle of attack to be investigated is inserted into a formula, and the answer tells the story.

Math. The formula for obtaining the lift of a particular wing is

$$L = \frac{p}{2} C_L S V^2$$

(Continued on page 40)

DRAWN BY CHARLES WERTMAN

MODELING YOUR FUTURE IN AVIATION

Official Air Youth course in elementary aeronauties

by

CHARLES H. GRANT

ARTICLE 5

Fig. 30. Reconnaissance plane carried by battleships and heavy cruisers (F.P.G.)

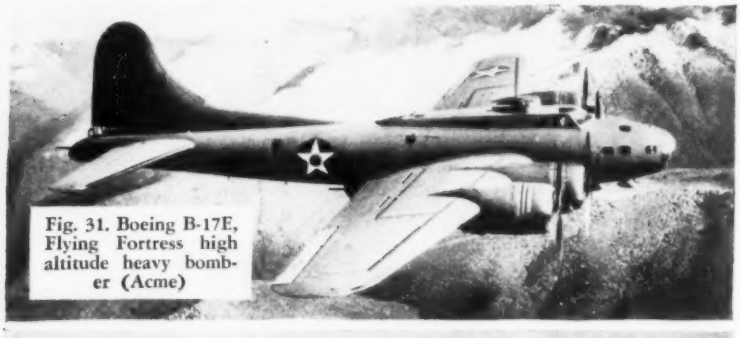


Fig. 31. Boeing B-17E, Flying Fortress high altitude heavy bomber (Acme)

Fig. 32. (Above) Douglas C-54, large four-motor U.S. Army transport (Acme). (Fig. 33. (Below) Army reconnaissance and liaison plane, converted from sportplane

Fig. 34. North American O-47, Army observation and reconnaissance plane (Kulick)

Copyright 1942, by Charles Hampson Grant.

Types of Planes and How Their Task Determines Their Design

SO FAR in this series of articles the purpose, required performance and structural form of pursuits, interceptors and light bombers have been discussed.

Heavy bombers is our next consideration. These are the artillery of the airforce; planes that carry great loads of explosives, releasing them on objectives to be destroyed. Their effectiveness depends on two things: first, the weight of explosives they can unload on the objective and, second, the accuracy of the bombing.

To accomplish this mission particular performance characteristics are required. Obviously their bombload must reach the target to be effective. So their performance must qualify them to overcome all obstacles to be encountered; enemy anti-aircraft fire and fighters, for example. This demands high altitude flying at high-speed, and armament capable of eliminating attacking fighters. Sturdy construction and armor protection is also a vital asset in getting a bomber to its target and home again safely.

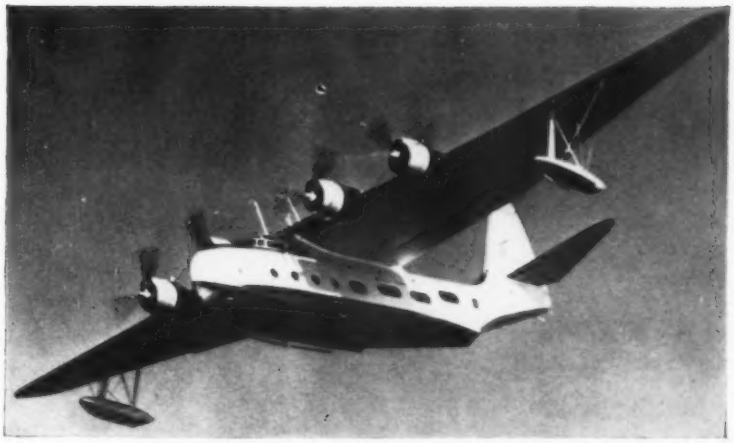
To fulfill the second requirement of accurate bombing is a difficult task, especially when flying at the high altitudes necessary to avoid anti-aircraft fire. However with the secret bombsight used in American heavy bombers this apparently impossible objective can be accomplished most effectively.

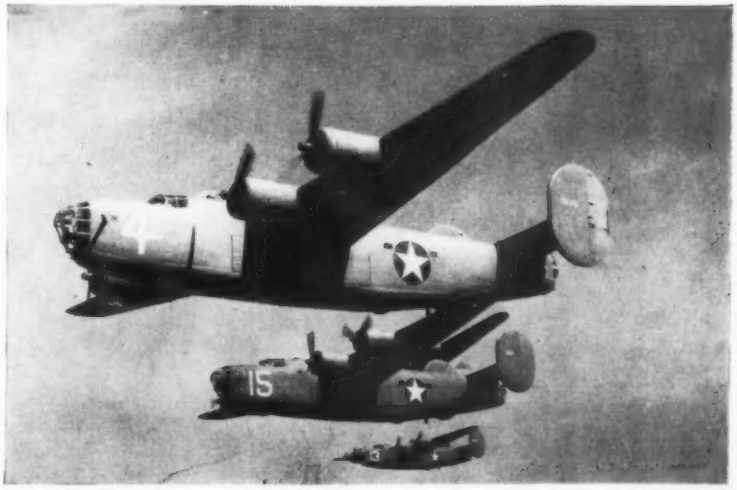
Consequently ideal performance requirements for heavy bombers are:

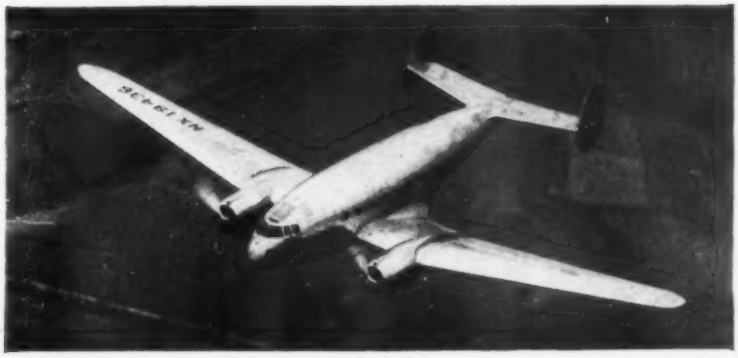
1. Capacity to carry heavy loads.
2. High ceiling (30,000 feet or more) to avoid anti-aircraft fire and enemy fighters.
3. High speed to make attack by enemy fighters difficult.
4. Armaments to knock out fighters attacking from any direction.
5. Sturdy construction to reduce the crippling effect of gunfire.
6. Armor protection for gunners, crew and fuel supply.
7. A means of dropping bombs on targets with precision from high altitudes.

To fulfill all of these qualifications to an effective degree, a plane must truly be a flying miracle.

Fig. 35. (Right top) Sikorsky Excalibur, hugh commercial ocean transport flyingboat (Acme). Fig. 36. (2nd from top) Consolidated B-24, heavy long range Army bomber (Acme). Fig. 37. (3rd from top) Mammoth British Halifax, heavy night bomber carrying 8 tons of bombs (Intern'l). Fig. 38 (Bottom) Curtiss 36 passenger, 3400 hp. commercial transport







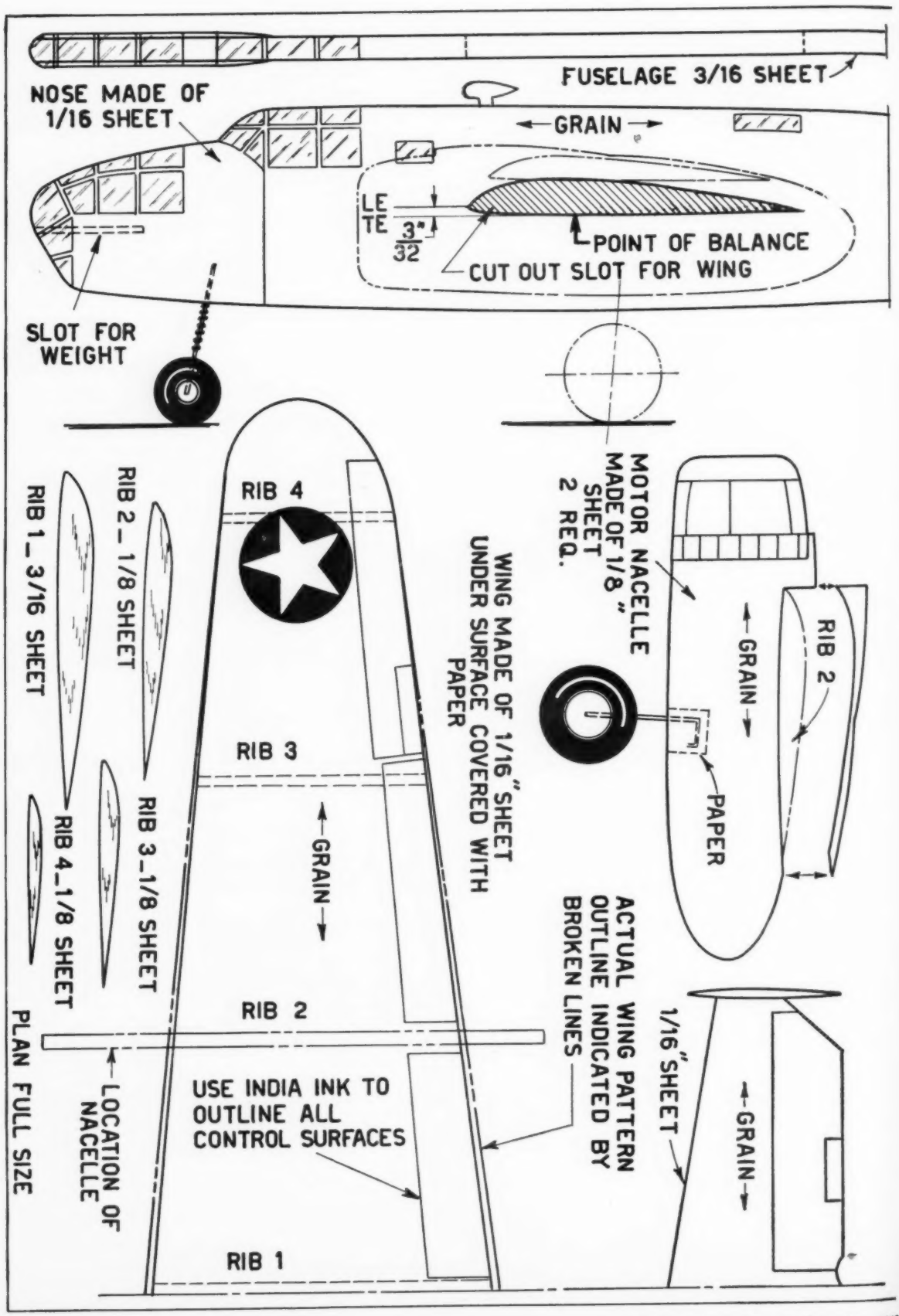
But let us see exactly what type of structure and mechanism is required. First the amount of bombs, armament, fuel and protective armor it can carry, as well as the structural weight and strength possible depends upon the capacity to lift heavy loads. This is accomplished by wing area and power.

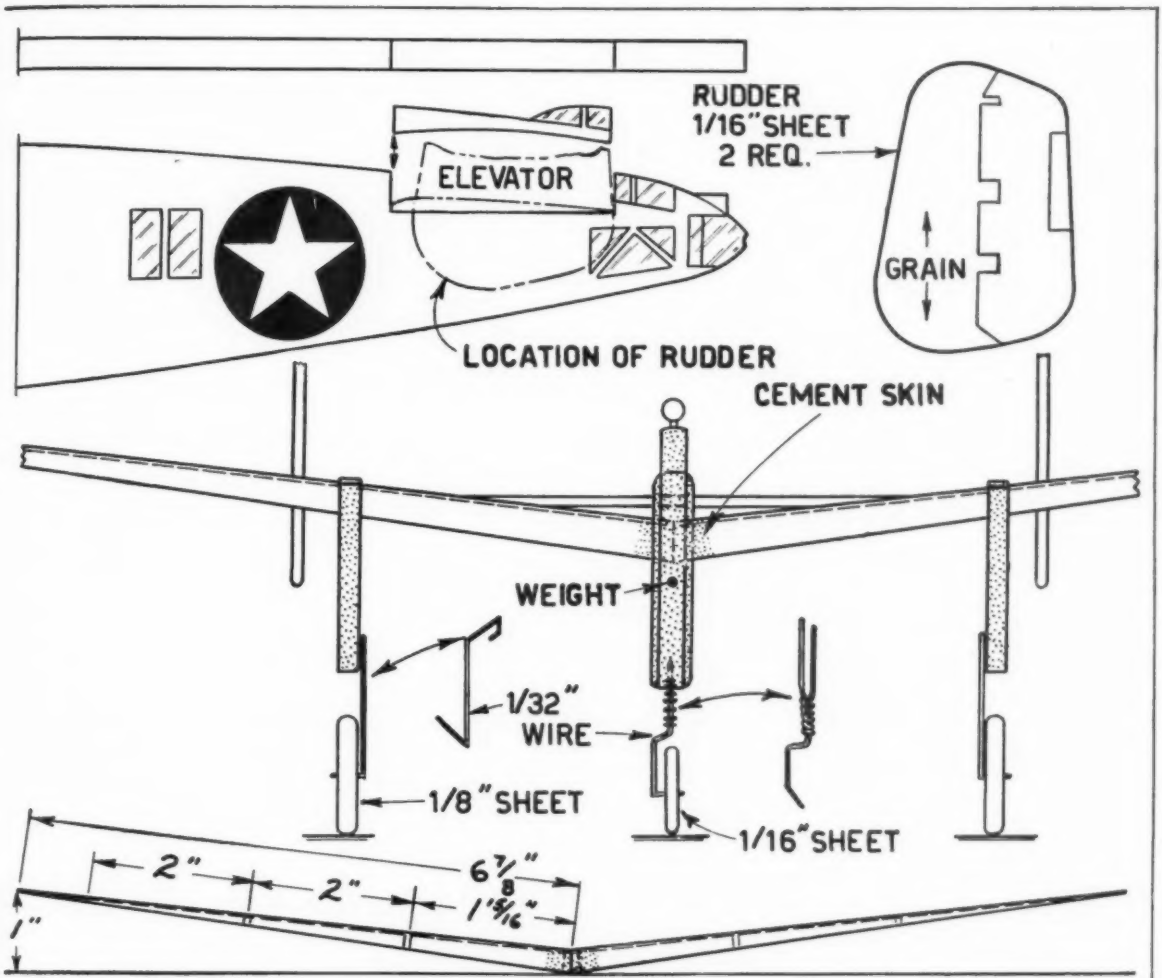
If tremendous wing area is used, allowing a comparatively low wing loading (20 lb. per sq. ft.), less power will be required than otherwise would be the case. This in turn reduces the amount of fuel necessary for a given flight range, thereby making it possible to carry greater bomb weight because the plane can lift just so much total weight. However, this type of bomber is comparatively slow because of its low power (high power loading pounds per horsepower).

British heavy bombers are in this class, with capacity for heavy bombloads (16,000 lb.) at a sacrifice of speed, fuel, high ceiling and protective armaments. This makes them easy prey for anti-aircraft fire and enemy pursuit planes on daylight bombing raids. Consequently they are used as night bombers, darkness being employed to shield these weaknesses. Fig. 36 shows the British Halifax heavy bomber.

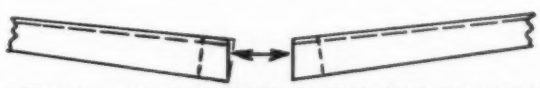
For high speed, greater power and less wing area must be used, and in order to carry protective armaments and added fuel required for the greater power, bombload must be sacrificed. American heavy bombers follow this pattern, filling all of the seven requirements listed previously. Great total lifting capacity is obtained by a combination of large wing area and powerful engines. However, unlike British bombers, part of the bombload has been sacrificed for weight of fuel, sturdy construction, guns, armor and capacity to fly at great altitudes. They carry 8000 lb. of bombs compared to British planes' 16,000 lb. but have the advantage of being able to attack objectives in daylight with effective protection from enemy fire and to drop their bombs with uncanny accuracy on objectives with the aid of precision bombsights. In this way they make their 8000 lb. of bombs as effective, from a military standpoint, as the 16,000 lb. bombload of the slower but more vulnerable planes.

Large wing area and great power being the chief requisite of the bomber, these planes necessarily have large wingspans and usually two or more motors developing from 4000 to 8000 total horsepower. Because the large wing provides ample fuel space and a rigid mounting for the motors, the fuselage can be of comparatively small crossection. This combined

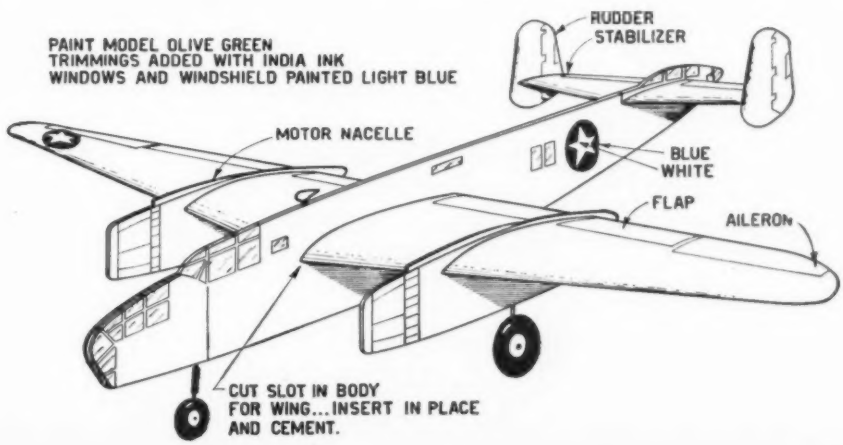

FUSELAGE 3/16 SHEET
NOSE MADE OF 1/16 SHEET
GRAIN
LE
TE
3/32"
POINT OF BALANCE
CUT OUT SLOT FOR WING
SLOT FOR WEIGHT
MOTOR NACELLE MADE OF 1/8" SHEET 2 REQ.
RIB 4
WING MADE OF 1/16" SHEET UNDER SURFACE COVERED WITH PAPER
RIB 2
GRAIN
PAPER
RIB 1_3/16 SHEET
RIB 2_1/8 SHEET
RIB 3
GRAIN
RIB 3_1/8 SHEET
RIB 4_1/8 SHEET
ACTUAL WING PATTERN OUTLINE INDICATED BY BROKEN LINES
1/16" SHEET
GRAIN
RIB 2
PLAN FULL SIZE
LOCATION OF NACELLE
USE INDIA INK TO OUTLINE ALL CONTROL SURFACES
RIB 1



WING HALF SCALE



BEVEL RIB 1 BEFORE CEMENTING PANELS TOGETHER



with careful streamlining gives greater speed than would otherwise be possible for such large planes.

Unlike single engine planes the motors may be mounted on the wing at intervals along the span. This arrangement requires less wing strength and weight than single engine planes where most of the load is concentrated at the center. Consequently more useful load can be carried with proportionally less structural weight for any given strength.

The Boeing B-17E (Flying Fortress), fig. 31 is an excellent example of the high-speed day bomber and has proved itself the most efficient bomber in the world today by its performance in Europe and the Pacific war areas. Another excellent ship of this type is the Consolidated B-24, fig. 35.

TRANSPORTS: There are two basic types of transports, military and commercial. Both are essentially the same, except that the commercial carries passengers and baggage while the military carries soldiers and equipment. The Douglas transport, fig. 37, used on many American airlines is an excellent example of the commercial version. One of the latest military transports is the Douglas C-54, fig. 32. For transporting over water flyingboats are used; these are similar in principle to land transport planes but usually are much larger and more powerful.

Now let us consider required performance characteristics of this type. The prime objective is to carry as much payload as possible; tremendous speed is not essential, usually medium speed is sufficient. No guns or armor plate are necessary; consequently the total lifting capacity of the airplane is used for passengers, baggage and fuel.

To some degree it is similar to the heavy British bombers because most of the lifting capacity is devoted to load carrying. It is not strange therefore that many transports resemble bombers, their general design being identical but without military accessories such as guns, turrets, bombs, etc. Excessive speed is not demanded, therefore there is less power for their weight than on high-speed bombers; the wing loading is also slightly less. Most of the land transports are of the 2 engine type but usually of shorter range and smaller than flyingboats, so they can be readily handled on flying fields.

Due to the long hauls required across oceans, flyingboats necessarily are very large, usually mounting 4 engines though some employ only 2. A typical ocean transport is the Sikorsky Clipper, shown in fig. 34.

RECONNAISSANCE: The purpose of this type is to scout the enemy, collect and deliver information, photograph objectives and serve generally as a coordinating medium among the various armed forces.

Unlike other types, the purpose has little effect upon the design of the ship, for nearly any basically good airplane can perform the functions required. The design is determined chiefly by *where* the plane is to operate and there are as many types of airplanes as there are sets of operating conditions. There are many, for each unit of the armed forces has its observation and scout planes; the Army, Coast Guard, Marines and the Navy.

The design of a reconnaissance plane with any particular military unit is determined by the unit's operating conditions. In the Army reconnaissance ships operate from rough and restricted areas, often taking off and landing in small fields or on roadways; consequently the prime requisite is a slow-landing rugged ship with considerable wing area. Usually it carries no armament, employing its lifting capacity for slow flight alone, a factor of great advantage in "spotting" for artillery. In this case it is advantageous to hover over the point of action, possible only with a slow flying airplane.

The Army has found that converted light sportplanes make excellent reconnaissance ships; they are sturdy though simply built, will take off and land slowly, have excellent visibility and are steady fliers. The latter allows the pilot to make observations without necessity of concentrating on flying his ship. Fig. 33 shows a U.S. Army Aeronca O-58-B reconnaissance plane converted from a sport model.

Another type of Army observation or reconnaissance plane is the North American O-47, fig. 39. This has been standard for a number of years, is quite large and heavy but with capacity for heavy

(Continued on page 60)

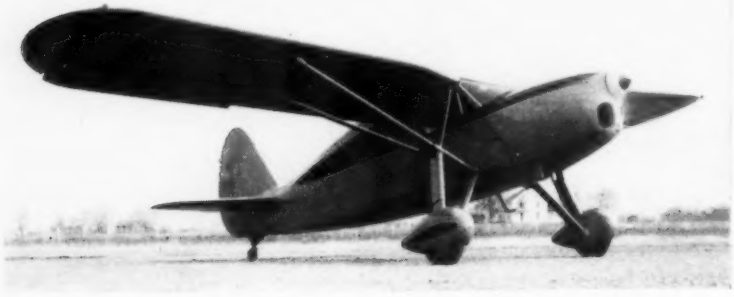


Fig. 39. (Above) Fairchild 24, heavy sportplane of 175 hp.; cruising speed 130 mph. Fig. 40 (Below) Consolidated PBY reconnaissance patrol boat

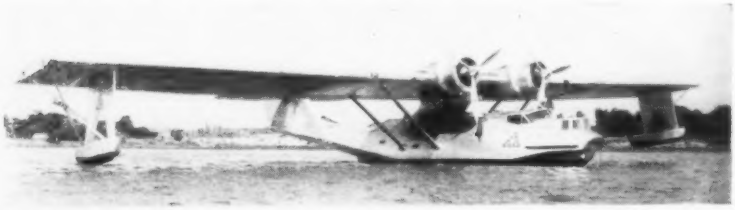
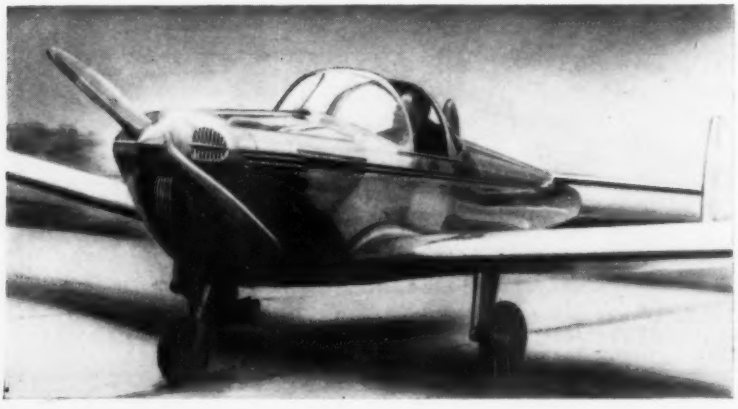


Fig. 41. (Above). Aeronca 50-L, light 50 hp. sportplane (Williams). Fig. 42. (Below) Low-wing Ercoupe light sportplane with three wheel landing gear



ARMY "GRASSHOPPER"

A flying model Taylorcraft O-57 that provides thrills of the full scale plane.

by SIDNEY STRUHL

THE Taylorcraft O-57, and other light planes now used by the U. S. Army Air Corps, are known affectionately as "grasshoppers." They have been found to possess excellent characteristics needed for all-around general purpose military aircraft; as useful in the air as the "jeep" and "peep" are on the ground.

The term "grasshopper" probably grew out of the Taylorcraft's ability to take-off and alight in very small and difficult landing fields. Their work is very diversified, ranging from artillery spotting and observation work to delivering war material and serving as taxis.

Aside from a complete radio outfit and several more flight instruments, the Army's version of the Taylorcraft is identical to the commercial one. And to show the Army's faith in these small light planes, orders are constantly being increased for "grasshoppers."

For a flying scale gas model the Taylorcraft leaves little to be desired. The design proportions are excellent for producing stable and smooth flights. And the construction of this type of airplane is so simple that even if this is your very first gas model you should find no difficulty whatsoever.

The flight characteristics are just about perfect. With an Ohlsson 19 in the nose the flight is very similar to the full size job. Along steady climb and when the motor cuts, well, the glide is as good as you'll find on any contest field. But when you install a big motor in the nose, such as a Forster 29, then the CLIMB is as good as any you'll see on the field. The size is just right too. The ship will take any of the larger size Class "A" motors and all Class "B" motors. A class "C" version may be obtained by enlarging the model 1-1/2 times which would net you a six-foot job.

All-in-all I think we can safely say that this little job is a scale model that can hold its own against any other and will give a good showing of itself in an endurance contest and to top everything else, is extremely easy to build.

Now what do you say if we get busy and build ourselfs a model of this here airplane just to see if I ain't right.

Fuselage

First of all it will be necessary to make full size drawings of the fuselage, wing and tail group. Most of the dimensions are given in the plans but sizes may be obtained by enlarging three times from Plates 1 and 2 as the given scale is 1/3" to the 1". All parts shown on Plates 3 and 4 are full size.

Lay the plans upon a smooth working surface such as a flat piece of pine board or other soft material so that pins may be pushed into it with ease.

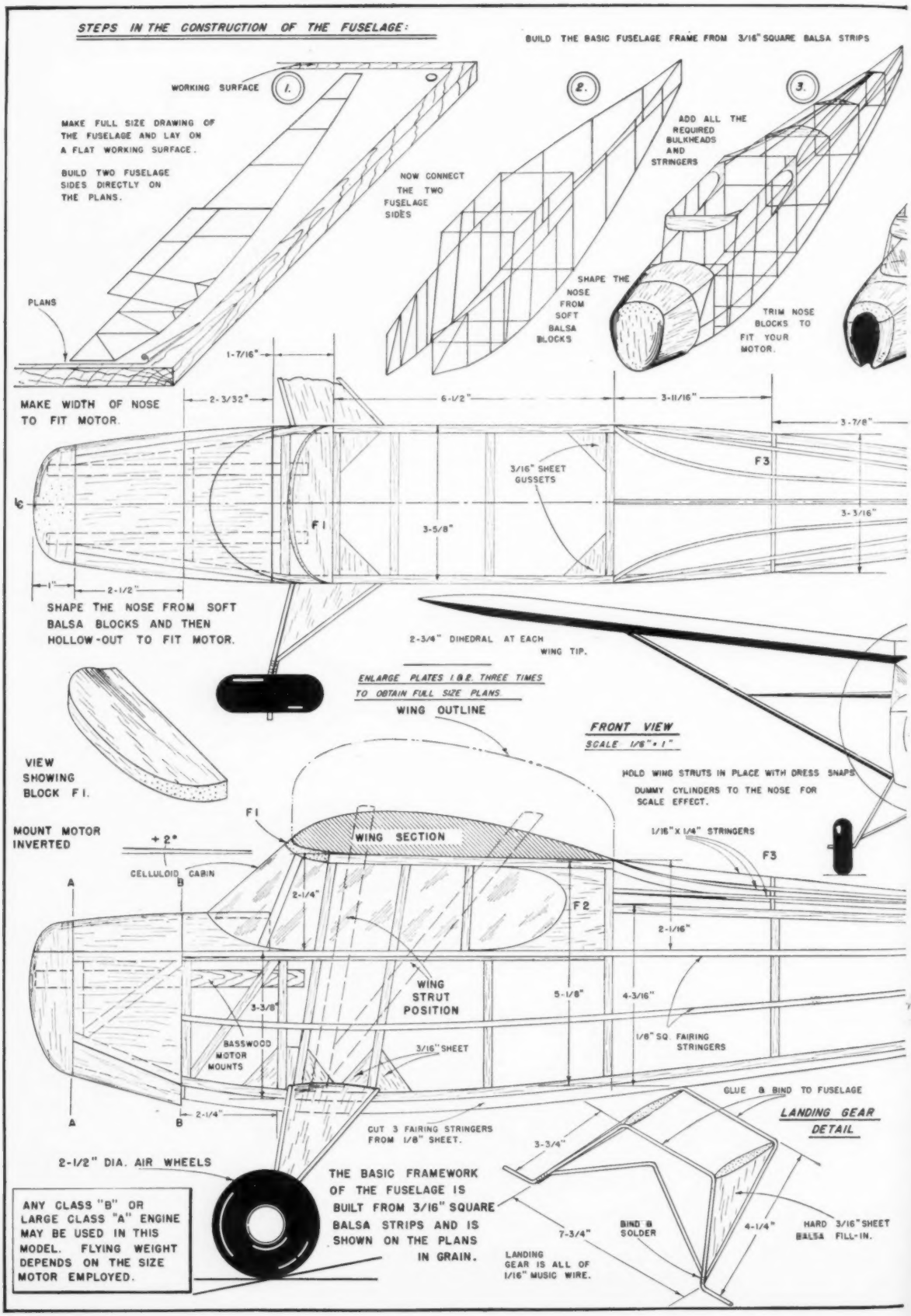
Construct the fuselage by first making two identical sides. Pin 3/16" square strips of balsa onto the plans wherever you see it grained. This constitutes the basic

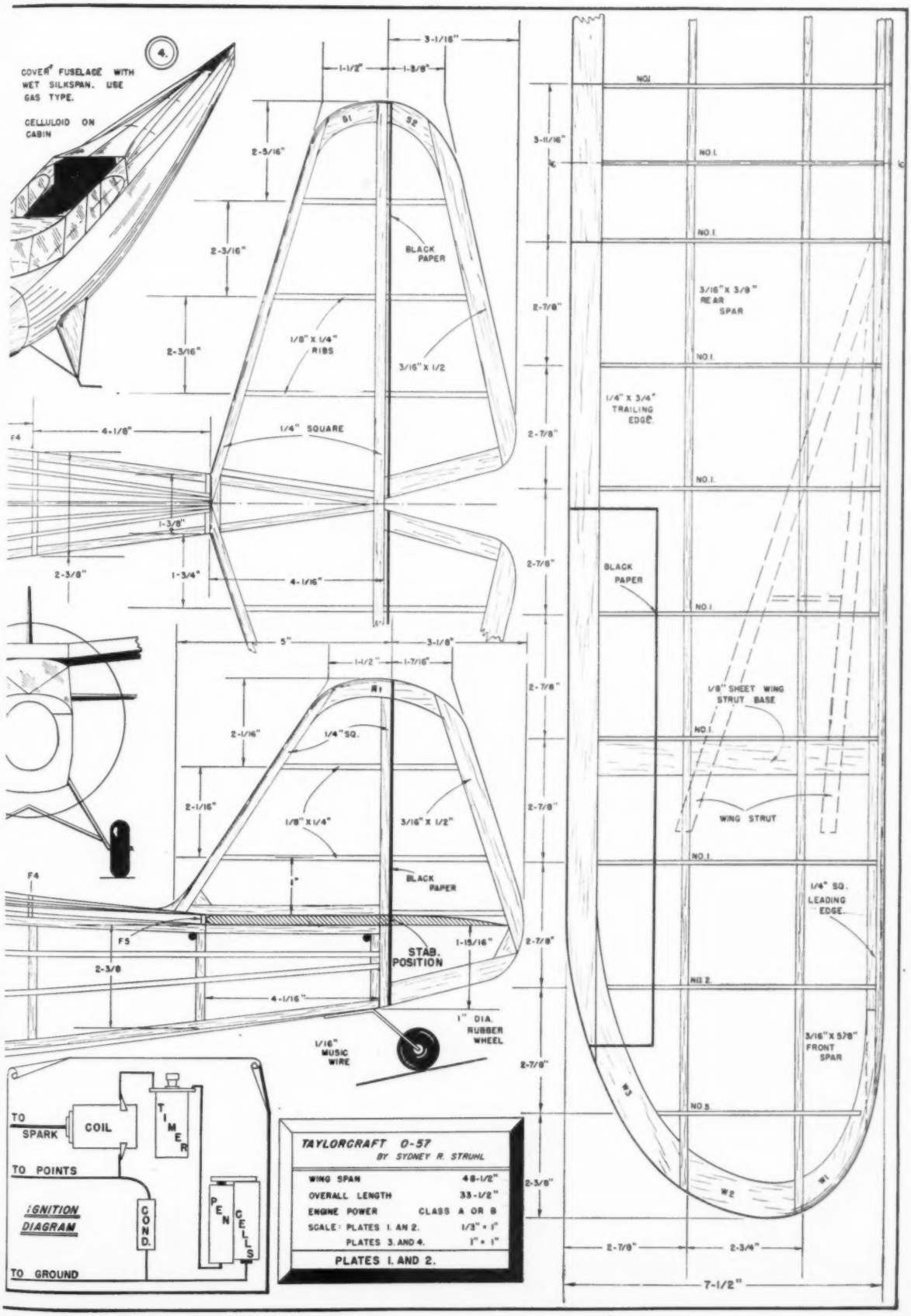
(Continued on page 34)

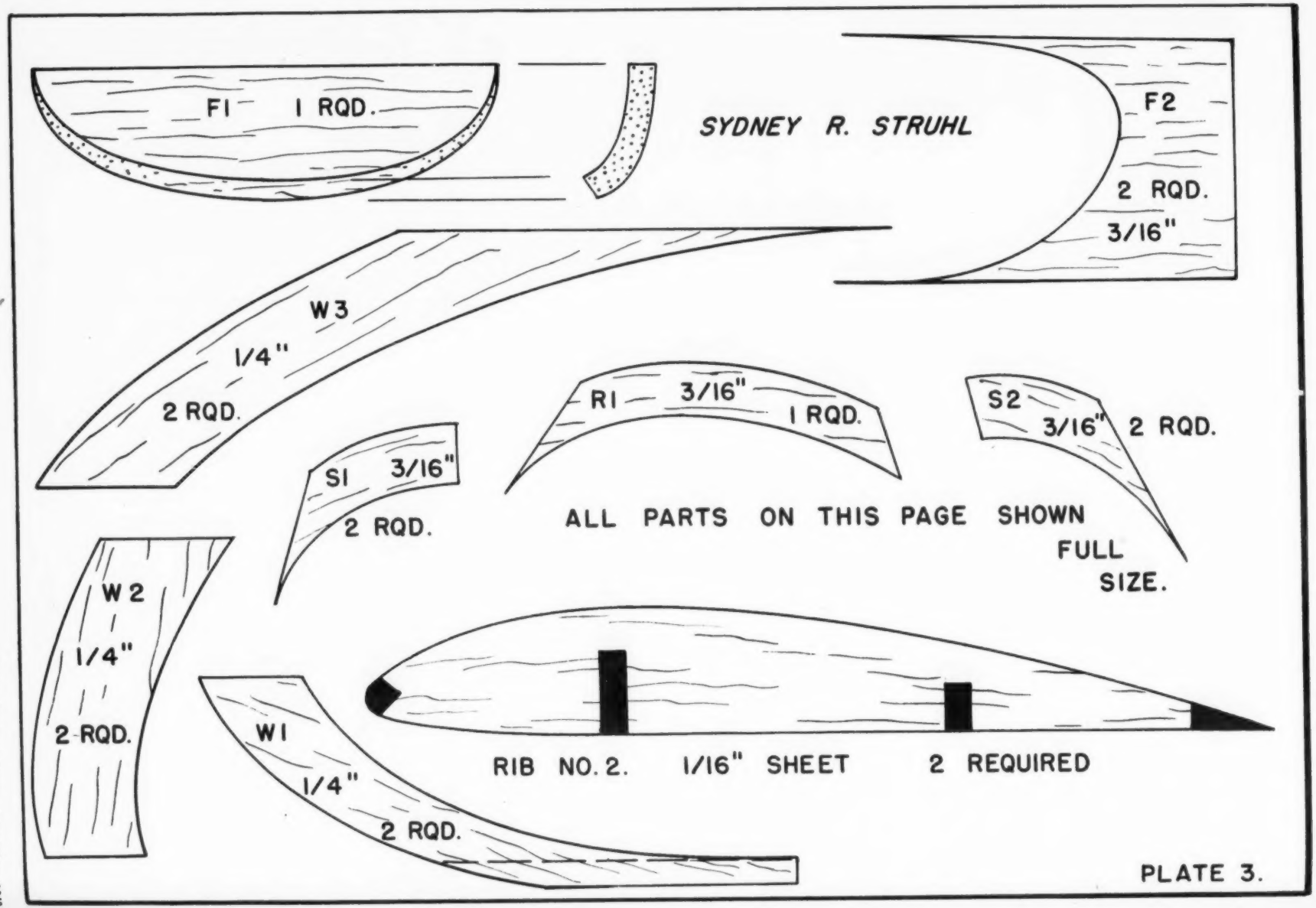
The pilot ready to test his model

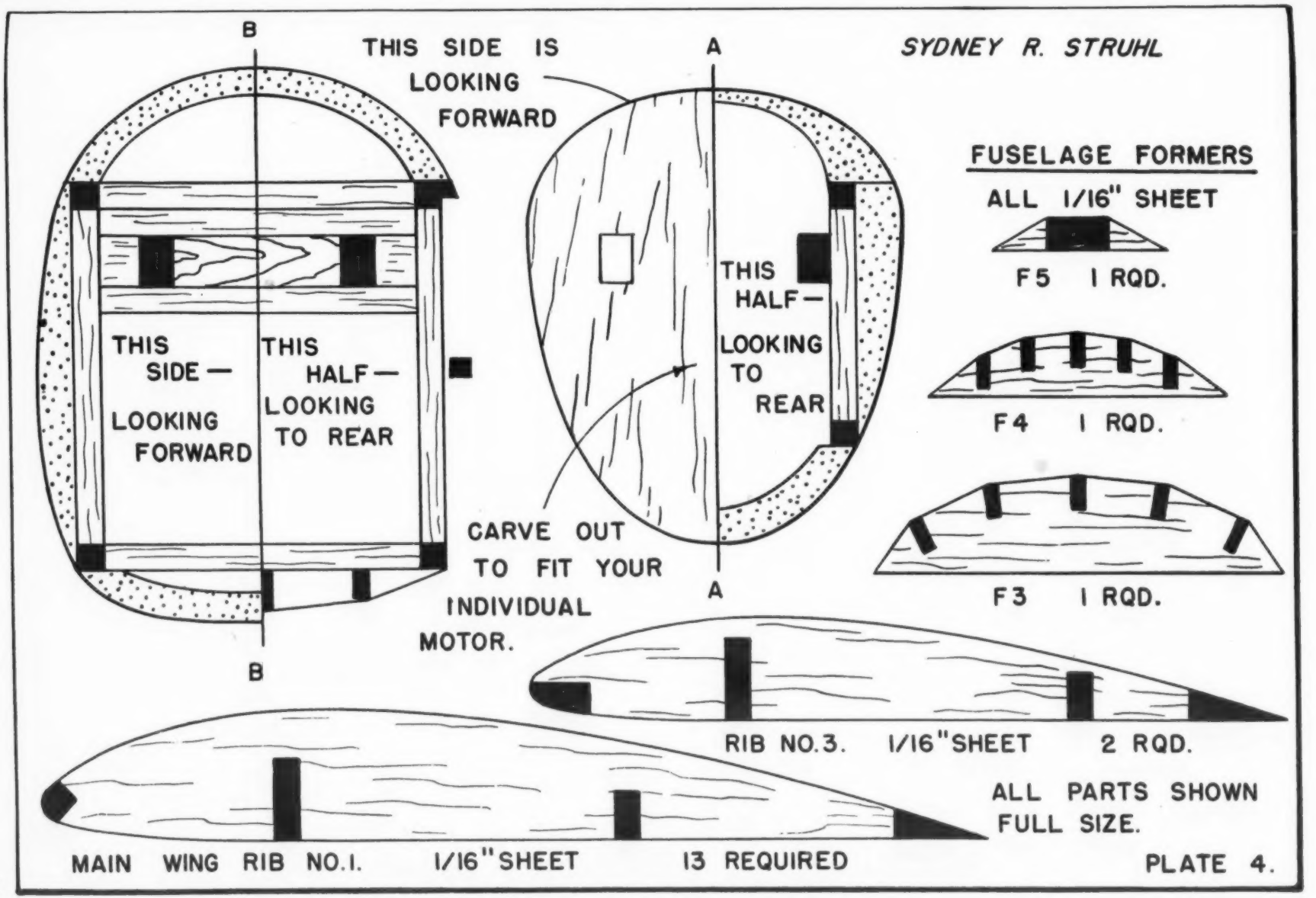
The model "grasshopper" on the airport ready to take off

It climbs like its full scale prototype


STEPS IN THE CONSTRUCTION OF THE FUSELAGE:
BUILD THE BASIC FUSELAGE FRAME FROM 3/16" SQUARE BALSA STRIPS
WORKING SURFACE
1.
2.
3.
MAKE FULL SIZE DRAWING OF THE FUSELAGE AND LAY ON A FLAT WORKING SURFACE.
BUILD TWO FUSELAGE SIDES DIRECTLY ON THE PLANS.
NOW CONNECT THE TWO FUSELAGE SIDES
ADD ALL THE REQUIRED BULKHEADS AND STRINGERS
SHAPE THE NOSE FROM SOFT BALSA BLOCKS
TRIM NOSE BLOCKS TO FIT YOUR MOTOR.
PLANS
1-7/16"
MAKE WIDTH OF NOSE TO FIT MOTOR.
2-3/32"
6-1/2"
3-11/16"
3-7/8"
3/16" SHEET GUSSETS
F3
F1
3-5/8"
3-3/16"
1"
2-1/2"
SHAPE THE NOSE FROM SOFT BALSA BLOCKS AND THEN HOLLOW-OUT TO FIT MOTOR.
2-3/4" DIHEDRAL AT EACH WING TIP.
ENLARGE PLATES I & II THREE TIMES TO OBTAIN FULL SIZE PLANS.
WING OUTLINE
FRONT VIEW
SCALE 1/8" = 1"
VIEW SHOWING BLOCK F1.
HOLD WING STRUTS IN PLACE WITH DRESS SNAPS
DUMMY CYLINDERS TO THE NOSE FOR SCALE EFFECT.
F1
WING SECTION
1/16" X 1/4" STRINGERS
F3
MOUNT MOTOR INVERTED
+2°
CELLULOID CABIN
A
B
2-1/4"
F2
2-1/16"
WING STRUT POSITION
5-1/8"
4-3/16"
3-3/8"
BASSWOOD MOTOR MOUNTS
3/16" SHEET
1/8" SQ. FAIRING STRINGERS
GLUE & BIND TO FUSELAGE
LANDING GEAR DETAIL
CUT 3 FAIRING STRINGERS FROM 1/8" SHEET.
3-3/4"
2-1/2" DIA. AIR WHEELS
THE BASIC FRAMEWORK OF THE FUSELAGE IS BUILT FROM 3/16" SQUARE BALSA STRIPS AND IS SHOWN ON THE PLANS IN GRAIN.
ANY CLASS "B" OR LARGE CLASS "A" ENGINE MAY BE USED IN THIS MODEL. FLYING WEIGHT DEPENDS ON THE SIZE MOTOR EMPLOYED.
7-3/4"
BIND & SOLDER
4-1/4"
HARD 3/16" SHEET BALSA FILL-IN.
LANDING GEAR IS ALL OF 1/16" MUSIC WIRE.

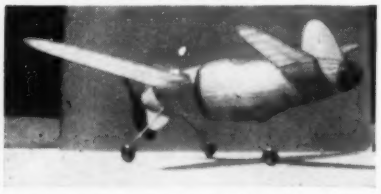

4.
COVER FUSELAGE WITH WET SILKSPAN. USE GAS TYPE.
CELLULOID ON CABIN
3-1/16"
1-1/2"
1-3/8"
B1
B2
2-5/16"
2-3/16"
2-3/16"
BLACK PAPER
1/8" X 1/4" RIBS
3/16" X 1/2
F4
4-1/8"
1/4" SQUARE
1-3/8"
2-3/8"
1-3/4"
4-1/16"
5"
3-1/8"
1-1/2"
1-7/16"
R1
2-1/16"
1/4" SQ.
2-1/16"
1/8" X 1/4"
3/16" X 1/2"
BLACK PAPER
F4
F5
2-3/8
4-1/16"
1-15/16"
STAB. POSITION
1" DIA. RUBBER WHEEL
1/16" MUSIC WIRE
NO.1
3-11/16"
NO.1
NO.1
2-7/8"
3/16" X 3/8" REAR SPAR
NO.1
1/4" X 3/4" TRAILING EDGE
2-7/8"
NO.1
2-7/8"
BLACK PAPER
NO.1
2-7/8"
1/8" SHEET WING STRUT BASE
NO.1
2-7/8"
WING STRUT
NO.1
1/4" SQ. LEADING EDGE
2-7/8"
NO.2
3/16" X 5/8" FRONT SPAR
W3
NO.3
2-3/8"
W2
W1
2-7/8"
2-3/4"
7-1/2"
TO SPARK
COIL
TIMER
TO POINTS
IGNITION DIAGRAM
COND.
PEN CELLS
TO GROUND
TAYLORCRAFT O-57
BY SYDNEY R. STRUHL
WING SPAN 48-1/2"
OVERALL LENGTH 33-1/2"
ENGINE POWER CLASS A OR B
SCALE: PLATES 1. AN 2. 1/3" = 1"
PLATES 3. AND 4. 1" = 1"
PLATES I. AND 2.


F1 1 RQD.
SYDNEY R. STRUHL
F2
2 RQD.
3/16"
W3
1/4"
2 RQD.
R1 3/16"
1 RQD.
S2
3/16" 2 RQD.
S1 3/16"
2 RQD.
ALL PARTS ON THIS PAGE SHOWN FULL SIZE.
W2
1/4"
2 RQD.
W1
1/4"
2 RQD.
RIB NO. 2. 1/16" SHEET 2 REQUIRED
PLATE 3.


B
THIS SIDE IS LOOKING FORWARD
A
SYDNEY R. STRUHL
FUSELAGE FORMERS
ALL 1/16" SHEET
THIS SIDE — LOOKING FORWARD
THIS HALF — LOOKING TO REAR
THIS HALF — LOOKING TO REAR
F5 1 RQD.
F4 1 RQD.
F3 1 RQD.
CARVE OUT TO FIT YOUR INDIVIDUAL MOTOR.
B
A
RIB NO.3. 1/16" SHEET 2 RQD.
ALL PARTS SHOWN FULL SIZE.
MAIN WING RIB NO.1. 1/16" SHEET 13 REQUIRED
PLATE 4.

1. (Above) Stan Staples' scale model Vought navy plane is a beautiful piece of workmanship. 2. (Below) Though in the Army Air Corps Jim Cornwell has time to follow his instructive hobby

3. (Above) John Warner's "pursuit pusher" that turned in a flight of 2' 23"



4. (Below) A model Wright Whirlwind engine composed of 800 separate parts

AIR WAYS

News Of Model Plane Experimenters From All Parts Of The World

A number of letters have been received discussing the merits and faults of the national rules, offering criticisms and suggestions that may be helpful. Some of the criticisms are justified, some obviously are not. We invite your comments and in our next issue will print them under the heading of "The Aviation Forum."

A LETTER comes from S. E. Smith, University of Alabama, Box 2416, which is most significant and verifies the contention put forth by model airplane educators for the past 20 years. The letter speaks for itself without added comment. Here it is:

"I have been building models for about eight years and am vitally interested in all phases of aviation. I have watched with great interest the struggle of model builders to keep the greatest hobby alive, and would like to put in my two cents' worth.

"I am enrolled here at the University of Alabama in the school of aeronautical engineering, taking my first course in aeronautics this semester and was rather surprised to find that I already knew practically all of the text book; what I didn't know was easy to learn, for many questions arising in my modeling were being answered. A great many of those in my class did not know the difference between a prop and a tailskid when they entered the course. As a result these boys are having a tough time. There isn't a model builder in the class who doesn't make good grades, so I *know* now that my modeling experience is invaluable. This great hobby is WORTH A DOZEN COLLEGE COURSES, and it should not be allowed to die out. My flying instructor told me that when he got a model builder for a student he had no doubts as to the student's ability.

"Though school work has put a serious handicap on modeling, I have still been able to turn out a ship or two. I am enclosing a picture of my 66" Buccaneer Standard which I have revised slightly. The ship is a very nice flier and it is plenty tough (it collided with a metal

(Continued on page 26)

5. A fine performing hydro built by Franz Secrest

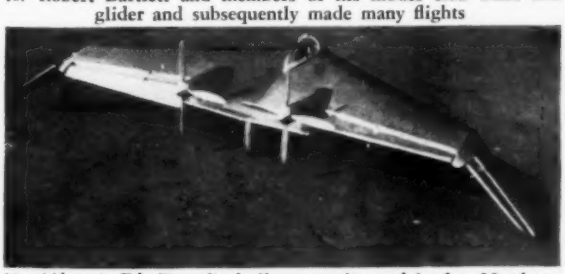
6. Bill Halbert with his speedy gas model. The single wheel is fared into the body to improve streamlining.

7. Everett Powers with his scale Fokker D-7 gas model. It flies well powered with an Atom motor

8. Jack Burke's Meteor looks like a full scale plane that has landed in an overgrown hayfield

9. S. E. Smith and his redesigned Buccaneer. His aviation training started with models

10. Robert Bartlett and members of his model club built this glider and subsequently made many flights

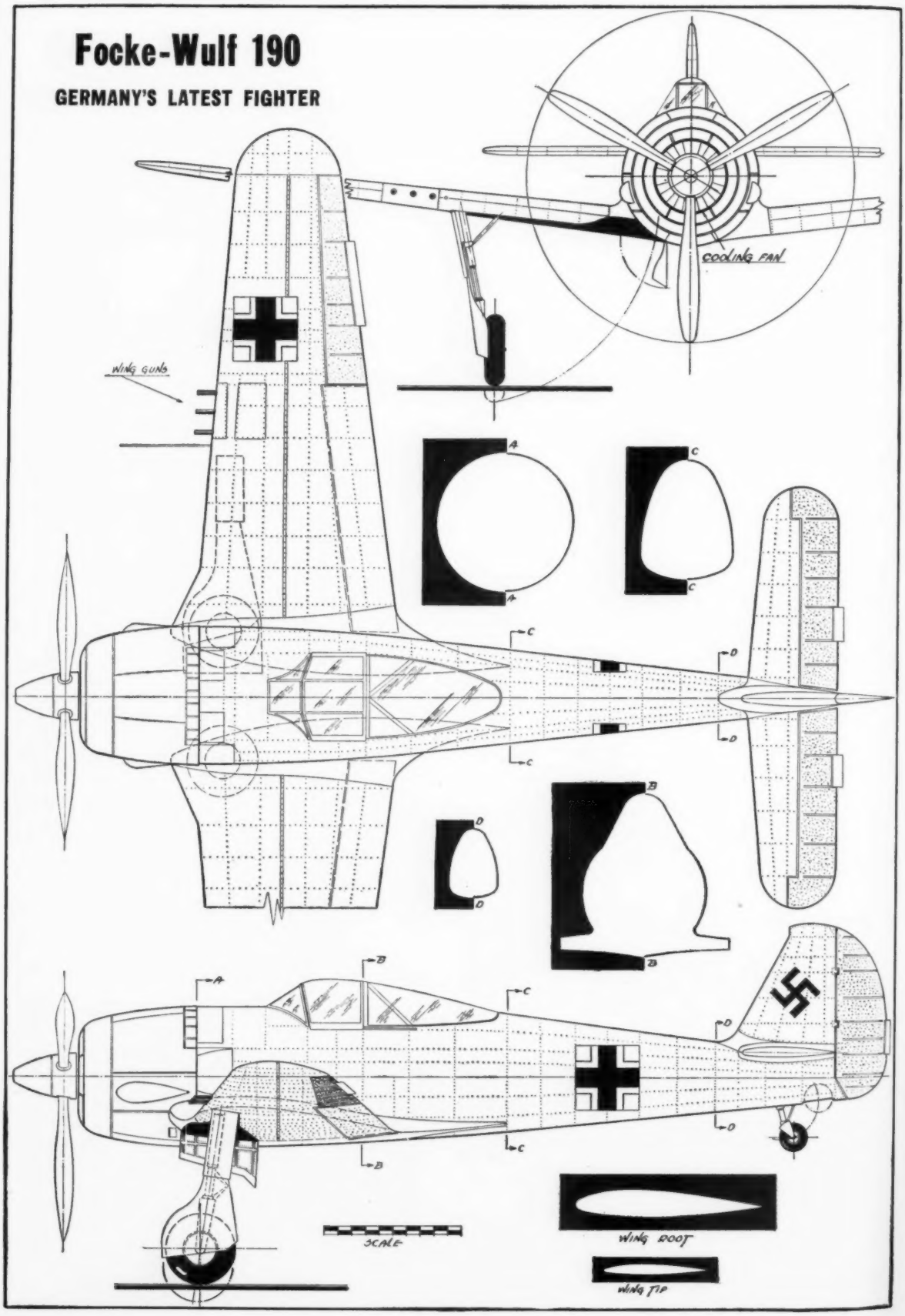


11. (Above) Ed. Trozal's built up scale model of a Northrop Flying Wing. 13. (Below) Members of the New Orleans Aero Club out for a Sunday flying session.

12. (Above) Ken. Witby's folding gas model propeller. The pitch can be adjusted as desired. 14. (Below) Russ Weber surrounded by his fleet of "U" control planes

Focke-Wulf 190

GERMANY'S LATEST FIGHTER



BERLIN BUTCHER

The plane on the cover

A captured Focke-Wulf 190 in flight over England (Intern'l)

GERMANY'S 1939 manifestation of air power comprised one tactical aim: numerical superiority in the air over the enemy; and September 3rd of that year found the Luftwaffe with an approximate 5-to-1 ratio over the Royal Air Force. To build such a superiority required planes designed primarily for production and secondarily for efficiency. Thus were born Messerschmitts, Heinkels and, most obviously, the Junkers Ju. 87b Stukas.

Field Marshal Herman Goering placed a new emphasis on the fighter-bomber combination and, after a year of desultory action biding his time to gain experience for his crews, he launched his gigantic Battle for Britain on August 8, 1940.

That year of experience displayed the Luftwaffe's concentration on two types of single-seat fighters: the Heinkel He-113 and Messerschmitt Me-109 (MODEL AIRPLANE NEWS, November, 1938, issue). The Heinkel, although a fast ship particularly at altitude, proved entirely unsatisfactory for use in large numbers, as its high wing loading gave poor maneuverability and a landing speed quite in excess of the 60-70 mph which has become the maximum safe speed for pilots of comparative inexperience.

Thus the Messerschmitt Me-109, and a later improved version of it, the Me-109F, has held the spotlight in Germany's single-seat fighter picture for the three years of this World War II.

For several reasons we have waited expectantly for a new single-seat fighter design to come out of Germany. The Battle of Britain, while taking a terrific toll in human life and property damage, was lost by the Luftwaffe, with a total of 2,375 German aircraft destroyed in daylight over England between August 8 and October 31, 1940, when the attack slowed and finally came to an erratic "pecking away" program. This loss can be blamed, at least partially, on the poor protection afforded by Messerschmitts for Heinkel and Junkers bombers.

England has continually improved her famed Spitfire until it is now capable of nearly 400 miles per hour in steady level flight as against the 371 of the Me-109. (The Hurricane, which for a time competed with the Spitfire for fighter honors, has now been definitely re-classified as a light bomber-fighter.)

All of these facts presaged a new design incorporating all of the Me-109's finer points, plus a variety of new engineering tricks. But the United Nations' engineers were completely surprised when the Focke-Wulf Fw-190, our Plane on the Cover this month, appeared in the skies over the Channel.

Chief element in this surprise was the air-cooled radial engine mounted in the new fighter, something few engineers ever again expected to see in a Nazi military airplane, most particularly a fighter design. In casting about for a powerplant, designer Kurt Tank was met with the fact that Germany had only one acceptable high powered engine in mass production: the Daimler-Benz DB-601, used in the Messerschmitt Me-109, Me-110, Heinkel He-113 and a variety of bombers and other craft. And the DB-601 was rated at only 1,040 horsepower, much less power than he wanted for his new fighter. Only alternative left was the large and heavy Junkers "Jumo" 205, a type entirely unsuited for a lightweight fighter, and a new B.M.W. double-row radial air-cooled engine styled along the lines of the Pratt & Whitney "Twin Wasp" and developed from P&W designs sold to Bayerische Motoren Werke, A. G. under a licensing agreement some ten years ago. This engine, the B.M.W. 801, developed a whopping big 1,600 hp. for takeoff and a thundering 1,480 hp. at 2,700 r.p.m. at

(Continued on page 50)

Focke-Wulf 190 ready for takeoff on a test flight in Britain; in some respects like Howard Hughes' racer

PLANE TRICKS

by ROBERT LLOYD BROWN

THE ideas presented on this page are not theory, but have been taken directly from engineering departments during the present national emergency. Knowledge of short cuts in general practice is not taught in schools, yet it is very important to the model builder who hopes for an engineering career. These hints also are valuable to the adult engineer . . .

Advanced model builders and aeronautical engineers are not satisfied with the usual small drafting board used in schools. Here is shown a large board, A, which is economical to construct.

To build models on the same table lay a 3/8" plywood sheet over the drawing table to prevent damage to the surface. Plywood in about 5 laminations makes a fine, economical drawing board. White pine about 1" thick is also often used.

Incidentally, never use thumbtacks to secure a drawing because the holes in paper tear, slipping the paper out of line. Moreover it is impossible to make a good drawing on tracing paper over thumbtack holes, necessitating a new board eventually, so why not use Scotch tape and preserve the smooth surface?

To keep the board clean engineers always cover it with cheap wrapping paper, secured at the edges with Scotch tape. The tape must be lifted and tightened to take out wrinkles which form every few days. To prevent wrinkles, tape paper at bottom edge of board, bend top corners under and tape rubber bands to the turned under-corners of the paper. Stretch the other ends of the rubber bands over the top of the board and secure underneath with thumbtacks. These rubbers always keep the paper tight and smooth.

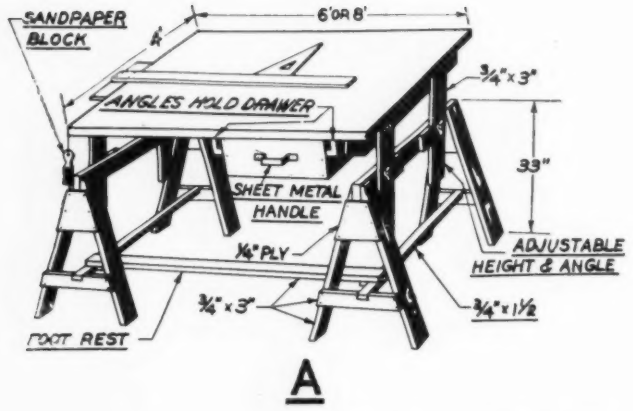
A simple straight edge consists of a T-square without the head. From an old Erector set obtain 2 short axles, 4 pulley wheels minus the set screws, 2 cog wheels with set screws, 4 short wood screws and washers and 2 screw sets for the shaft ends. These parts are shown below.

The drawing board, B, is the type usually found in aircraft factories. A board is laid across two sets of drawers. Because it is necessarily high, a foot-stool or crosspiece is used with a drafting stool. Left edge of board is machine-planed to make a straight edge for a T-square. Many use a tilted table to get closer to all parts of the drawing with less back strain; others like a flat table to prevent tools from rolling off.

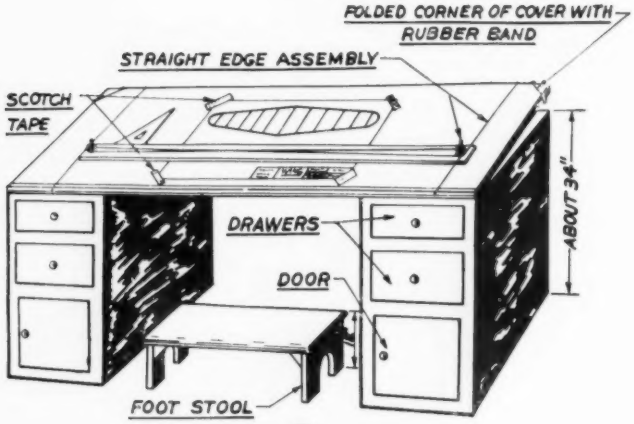
Height of drafting board should be 4" less than waist high; with this height one can stand comfortably and lean over to draw any place on the board. Large boards not only accommodate large drawings but also provide space for your tools. Simple equipment can be made for the average model builder with limited facilities. He can pick up some cheap 5-ply plywood, say 3'-6" x 4'-0" (with left edge planed), place it on a card table and use a T-square or rig up a straight edge from scrap material, an Erector set, or from ready-made parts purchased from a drafting supply store.

Two cords are tied to brads at the lower edge of the drawing board; cord going up over one pulley and under the other one as shown. Line up straight edge approximately, pull cords quite tightly and tie to brads at top. Cord must not go from an upper pulley to a lower pulley—a twisted straight edge results. Large T-squares are inaccurate and hard to handle. The straight edge is simple to assemble and more accurate than the T-square. The straight edge remains parallel to the board's edge as it moves up and down because one pulley at each end uses the same cord.

VICTORY



A



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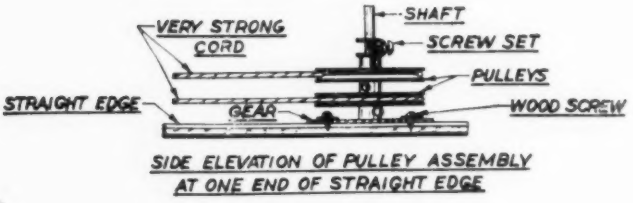
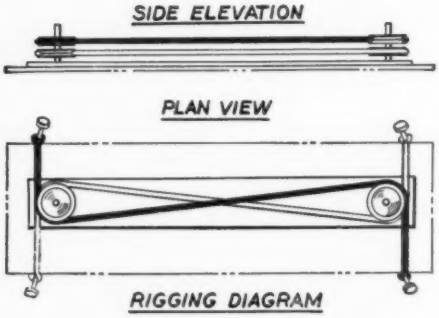


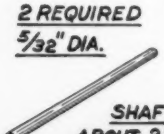
SIDE ELEVATION OF PULLEY ASSEMBLY AT ONE END OF STRAIGHT EDGE



RIGGING DIAGRAM

PULLEY WHEEL

4 REQUIRED



2 REQUIRED 5/32" DIA. SHAFT ABOUT 2 1/2" IN LENGTH

GEAR

2 REQUIRED

2 REQUIRED

SCREW SET

4 WASHERS

VERY SMALL, SHORT, WOOD SCREWS, 4 NEEDED

AIR YOUTH

(A Division of the National Aeronautic Association)

Official Model Airplane News Prepared by R. W. Nichols

Chairman Everett N. Angus of A.M.A. Contest Board Talks on Contest Rules

"HAVE made a rather complete survey among the leading modelers and groups both in New Jersey and parts of Pennsylvania regarding several points connected with model activity in general. Have wanted to find out what was wanted and what was needed to improve the game and at the same time please the average flyer.

"My findings have been varied in many ways but as a whole, nearly all are thinking along the same line. The one outstanding thought with not a single negative answer is that model flying must continue and more must be done to see that regulations don't prevent it. Much concern is shown for the disregard by a few of the regulations to prevent ships flying away. Several persons in higher offices have made comments regarding this now that civil aviation has been curtailed. We don't want dethermalizers or extra weight to become a law as it will do more harm than good, but we must do something to impress upon the few what they are doing can, and will if continued, stop the sport for all.

"The few that have been against the four minute limit are, after entering a half dozen meets, convinced that it is a lot better than they thought; in fact, some feel it requires more skill than before, and I agree. Our meets have been most interesting and adjustments for consistency have been made in evidence. The thermal flight is still with us, of course, and always will be, even if sixteen ounce loading were used, but the use of dethermalizers is increasing both in number and quality.

"About the greatest complaint has been regarding the timing. A large number feel that if a flight of over six minutes occurs, it should not be classed as an "official" and void all chances in the group of three in which it occurs. This may sound logical on the surface, but the real reason for the limit of six minutes is for the purpose of penalty and an endeavor must be made to prevent the penalty. If a flyer makes a ten minute flight on his very first attempt and was allowed two more chances in that group and then three more chances in each of the next two groups, he could have a total of nine out-of-sight flights in one class at one meet and we really don't want as much as a single flight of this type in all the meets combined. Flying within the three mile limit of full-sized aircraft in the east was not suitable to the Army, and certainly uncontrolled, unlimited model flying won't be either.

"The main cry for real new rules is for tether flying. We have had quite a large amount of success in our control events this year and are sure rules can be made that will bring such flying under A.M.A. regulations. From the start it has been my opinion that there must be two events to cover tether flying at all meets. The beginners in tether flying is more interested in whether he can fly it rather than its actual speed. Feeling that the beginner is the backbone of all enterprise, we cater to him by having one event called a 'control' event. Many of the tether boys are experienced builders, in fact the majority are, so they are satisfied to remain in the 'control' class just as many have always been in only class 'A.' For the boys that really want to "shoot the works," we have the 'speed' event. Such well-known builders as Shulman, Weber, Gray, Ripley and many others go in for both events and give wonderful accounts of themselves. The two events certainly have made it fair for all and have, I believe, created a very good feeling between flyer and sponsor. We shall continue this group of events until we can find a better way.

"The majority of tether flyers don't use a fixed design of course and we are seeing more of the 'sixty' jobs with a one-foot span. Personally I feel nothing can be gained by going to such extremes except perhaps it's a better way to exterminate motors faster. Rules covering tether models should be broad enough to allow plenty of original designing, but to take the models out of the 'egg-shell' class. Power loading is perhaps the answer, that is if it is fairly heavy. Several have felt that one-half inch wing span per 1/100 inch piston displacement should be the entire regulation. This would of course leave the area and aspect ratio up to the builder. With no power loading, I am quite certain the ships would be rather fragile if the boys went the limit. From my own observation, it would appear that the .5 inches per .01 piston displacement

(Continued on page 46)

FLYING CADET PHRASEOLOGY

ALTHOUGH the Corps of Flying Cadets does not have the background of the United States Military Academy's generations of students, a true *esprit d'corps* has been built up and is continuing to grow.

The language of the Flying Cadets is dotted with highly colorful expressions, new ones being added as the occasion arises. "It's the slang of today that's accepted tomorrow."

HOMING DEVICE . . . A furlough or leave of absence.

BLACK WEDNESDAY . . . Calisthenics with rifles on that day.

COUNTRY CLUB . . . Randolph Field.

BIRD DOGGING . . . When a lower classman dances with an upper classman's date.

GET EAGER . . . To strive to the utmost.

RAT . . . Balls of lint that suddenly appear on the floor; most noticeable when a cadet is standing at attention during an inspection of his room.

MICE . . . Little "Rats."

SPIN IN . . . Go to bed, take a nap.

TAKE OFF . . . To leave at a high rate of speed.

RAUNCHY . . . A name applied to anything that is dirty or in bad shape.

WASH OUT . . . To be eliminated from flight training.

WASHING MACHINE . . . The Flight Commander's airplane.

THE "GREY GHOST" . . . The Stage Commander's airplane, so named because it's the last plane one rides in before being washed out.

PUSH BUTTON PILOTS . . . Those cadets who are assigned to Flights using the BT-14's differentiating from those cadets who train on the more elderly BT-9's.

ROLL UP YOUR FLAPS . . . Stop talking.

SUGAR REPORT . . . A letter from a Cadet's girl friend.

TAXI UP . . . Come here.

MISTER . . . The name every Cadet is known by from the day he arrives at Randolph Field.

CADET WIDOW . . . A young lady who has known Flying Cadets for several classes.

BUNK FLYING . . . Talking aviation while in the barracks.

"DRIVE IT IN THE HANGAR" . . . "Let's stop bunk flying."

STORM . . . Excited Cadet's condition: when he doesn't know what he is doing he is in a storm.

DAWN PATROLLING . . . Arising before reveille.

DODO TOM . . Janitor of B Company, whose service dates back to 1922 at Brooks Field, but has never been in an airplane.

DODO . . . Name given to Flying Cadet until he has soloed.

GIG . . . Demerit.

TOUR . . . An hour of marching on the ramp with rifle and white gloves, given as a penalty.

HOT PILOT . . . One who thinks he is exceptionally good.

"6 AND 20 TOOTSIE" . . . Any bit of enticing feminity who is responsible for a Cadet returning late from a week-end leave . . . "6 and 20" meaning 6 demerits and 20 tours.

RIDING THE BEAM . . . Gazing at the ceiling after violating a custom in the Mess Hall.

WHOOFIN . . . To tell a rather tall tale or fable.

Air Ways

(Continued from page 20)

airport marker at full speed and only bounced). It is powered with a Brown B.

"There isn't as much activity down here as there is at home (I hail from Nevada, Missouri), but that is principally because most of the model builders are in engineering schools and that requires a lot of time.

"If there are any builders near Tuscaloosa I would like to hear from them."

Picture 9 shows Smith with his modified Buccaneer.

Our organized educational system during past years has failed to recognize the educational value of model planes; however, recently, through necessity of war and promptings by governmental heads, it has instituted an official course in aviation training in all schools throughout the country. These courses started in September and are wide in scope; even geography and history books are written in terms of aviation; math problems are aviation problems and model airplane building constitutes a large portion of the program.

A few leaders in the educational system have seen the dawning light of aviation and have worked unstintingly to introduce aviation into the schools, but the system as a whole has resisted change from old orthodox ways. In fact, the model fan himself has changed this whole picture and situation; he "sold" model airplanes to his father, his father sold it to government officials, the officials sold the idea to educational men and now educational men are working to expand the ranks of model builders. There is an old saying that "from the mouth of babes come words of wisdom," and model airplanes is a typical example of this, and model builders deserve most of the credit for our present airmindedness.

The name "Scale model" covers a great deal of ground, from simple paper ships to those constructed in complete detail; the latter variety is the exception and always inspires greatest admiration for the builder. Stan Staples of 220 Broadway, Chico, Cal., is in this distinctive class. He sends us picture 1, showing his scale Vought Navy observation plane. This might readily be taken for a picture of a full scale ship; as you see, every detail has been worked out with the greatest care, especially the brace wires and their manner of adjustment. This little ship probably is as nearly perfect as it is humanly possible to create. Mr. Staples tells us very little concerning its construction but careful observation indicates that it possesses the exact number of ribs in the wing as the large ship and all possible details are complete. Model work such as is illustrated here is always in great demand by large aviation companies, "movie" organizations, and other commercial concerns.

James W. Cornwell from Royal Oak, Mich., was once a model builder and received his basic aviation training by building all kinds of miniature ships for 9 years. Then he attended Wayne University, taking up the study of aeronautics, but the war interrupted his study and he joined the U.S. Air Forces, rolling up some 70 hours of flying time in the basic course at Randolph Field, Texas. However his "first love" followed him into the Army and he still spends his free moments designing and building all types of models.

Picture 2 shows him putting the finishing touches on a flying scale Lockheed P-38. Here is another illustration of how model builders are contributing to the efficiency of our flying services.

In a previous issue of MODEL AIRPLANE NEWS plans for a canard single-propeller pusher pursuit job of original design were published. This plane attracted John B. Warner of 822 Marine Ave., Wilmington, Calif., so he undertook its construction. He says:

"Its unique design appealed to me and when flown proved an exceptional performer."

The model, shown in picture 3, turned in a flight of 2′ 23″; this is phenomenal for a model that was not designed for a contest ship. In the picture you will note that considerable dihedral is used on the front wing or elevator; herein lies the "trick" of making a pusher perform well. About 25 degrees should be used on each forward wing with about 6 degrees on the rear wing.

15. David Mellius with his bat shaped gas model. It flies as well as his other models

Due to the shortage of balsa wood and other vital materials used in making model planes, a number of flying model fans are turning to solid models. An excellent piece of scale work is shown in picture 4—a model Wright radial engine built by Hugo Gooderum, Jr., of Canby, Minn. It is an excellent piece of work; the motor is only 3-1/8″ in diameter, including more than 800 separate parts. It required 75 hours to complete, which is a rather short time to turn out such a fine job. The various parts are built of balsa, piano wire, model pins, short lengths of brass tubing, etc. Gooderum says:

"I always disliked motors, but turned to this just out of curiosity and can say I really learned something about airplane engines, by looking up material for the plans and building it. If you have never built a model motor you will be surprised how much fun really exists in these 'uninteresting' things."

We have a letter from Franz B. Secrest of 816 Tangier Ct., Mission Beach, Calif., former correspondence secretary of the San Diego Aeroneers. He also sends a picture, 5, of his latest gas model, his first hydro. He tells us:

"It is my first attempt at designing a ship of my own. I have built a number of gas motor powered model boats so the floats were not much of a problem; they are built up of all balsa sheet. The floats come off by removing three bolts and two nuts. Wheels replace them.

"The model with floats flies much better than with wheels, though I only flew it with wheels once."

The plane has a 6′ span, is powered with a Mighty Midget. On half-throttle the plane runs from 20 to 30 ft. before takeoff; the landing is perfect. The third test flight was nearly 2 minutes in duration on a 20-second motor run.

In communities lacking proper facilities for land planes it might be an excellent idea for modelers to turn to hydros; water always provides an unobstructed landing field and usually, as in this case of Mr. Secrest's model, hydros fly better than planes with wheels. This is not accidental but is due to a feature of design afforded by hydros: adding floats lowers the keel area or center of lateral area, usually bringing it on a level with or slightly below the center of gravity. This always improves stability of a gas model, giving it greater steadiness under all flight conditions. Another factor which improves flight is lowering of the c.g. by adding floats. Best results are obtained when the c.g. is below the thrust line. This helps to eliminate stalling tendencies, providing a force couple when the ship stalls that noses the plane over into normal flight again.

We have an interesting comment from Edwin Smull of Wilton Junction, Iowa. He says:

"I built Ray Beaumont's 'sticker' which appeared in the July issue of MODEL AIRPLANE NEWS. Recently, it flew out of sight after 10 min. 20. sec. I never did wind it to capacity, the number of turns on this flight being only about 800. Powered with 16 strands of 3/16″ rubber, it had a fast climb and was adjusted for fairly tight gliding circles.

"Can anyone tell me how *high* a model of about 3-foot span must climb to go out of sight? On the 10 min. 20 sec. flight, I am sure that the plane must have been over 2,000 feet up, as it was drifting very slowly and escaped the eye mainly because of its height.

"Express my thanks to Ray Beaumont for his efficient design; I'll have to build another model, though, for I forgot to put my name and address on the first one. I intend to incorporate some sort of dethermalizer in the next one.

"My only consolation comes from the fact that I took a picture of it, in Kodacolor, the day before I lost it."

Mr. Al Davis of Chicago sends us some news and pictures from that active community. Picture 6 shows Bill Halbert and his original designed "mono." Picture 12 shows Kenneth Witby's folding, adjustable pitch propeller.

Bill Halbert's plane has an extremely

(Continued on page 53)

SKY SCOUTS

LESSON 10

TEN months ago, without warning, war descended from the skies upon the United States and people cast furtive glances skyward, wondering if their community would be the next to feel the blasting bombs. Airplanes were just airplanes to most of them; friend or foe appeared alike.

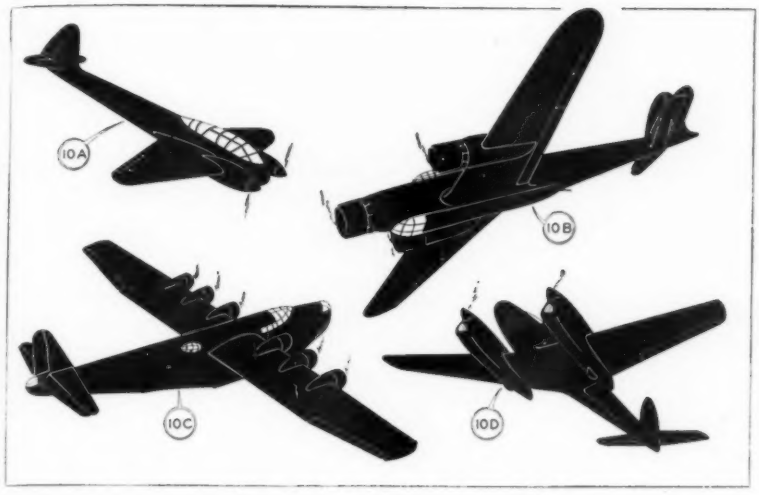
With the organization of civil defense, the necessity for expert plane spotters to warn of approaching danger became apparent. Mr. Average Citizen, who was to fill these ranks, was caught without the "goods," for he could not tell one plane from another. In great haste the government proceeded to supply all possible information with silhouettes and pictures of various planes. Volunteer spotters pored over manuals, booklets and other available data to qualify for their tasks.

However they had not "lived" airplanes like thousands of *young* men and, in spite of their efforts, lacked fundamental aviation knowledge and that keen sense of differentiation born of constant association with the subject. Model builders and other young aviation-minded fans were able to distinguish various planes at a glance: They were the ones who could render valuable service as spotters or as assistants to patriotic volunteer adults.

All that was needed was a refresher course in recognition of the latest types of enemy ships. So MODEL AIRPLANE NEWS organized *The SKY SCOUTS* and provided a twelve-month training course in spotting enemy planes in order to help aviation fans qualify as plane spotters.

This course consists of a series of plane silhouettes with descriptions of their outstanding characteristics published over a twelve-month period. Three or four planes are presented each month; the first series appearing in the February 1942 issue; the tenth series is given on

(Continued on page 36)



Description of Silhouettes

PLANE 10A—The Messerschmitt Me 210 is a long range fighter-bomber developed from the Me 110 but with a much greater capacity for bombs and longer range. It is believed that the craft carries about 4,000 lbs. of bombs. It is a two seater plane powered by two 1,450 hp. Mercedes-Benz DB 603 motors. Its armament consists of two cannon and four machine guns all located in the nose. Maximum speed is said to be 285 mph. at 18,500 feet; span 53 ft. 6 in.; length 36 ft. 4 in.

PLANE 10B—The Cant Z 1007 *bis* long range bomber. Reputed to be one of Italy's best airplanes the 1007 is constructed of wood and is powered by three 1,000 hp. Piaggio P X1, RC 40 fourteen cylinder double row engines. Top speed is 280 mph., and range is set at 3,100 miles. The normal crew of the ship number five: two pilots, two gunners, and a navigator-bombardier. Armament on the ship is relatively poor. Only two gun stations are used; one at top of the fuselage aft of the wing, another beneath the fuselage in the bomb belly. Span 81 ft. 4 ins.; length 60 ft. 4 ins.

PLANE 10C—The Blohm und Voss Bv *222* long range patrol boat designed before the war as a transoceanic transport but later converted into a patrol boat. Powered by six 1,000 hp. BMW 132 Dc engines, the craft is capable of about 200 miles per hour. Since its conversion, multi-gun turrets have been stationed in the tail, nose and sides of the hull. Span 150 ft; length 112 ft. Little information has been assembled on this craft to date; however, when more information infiltrates from Germany it shall be made available.

PLANE 10D—The Henschel Hs 129 single-seat close support fighter-bomber recently coming into squadron service and used mainly for ground attacks. The craft is powered by two 450 hp. Argus As 410 engines and is capable of speeds up to 225 to 250 mph. at low altitudes. Its armament consists of two cannon and four machine guns all concentrated into the nose of the craft. Span 50 ft.; length 38 ft.

THE INSTRUCTOR SAYS—

MOVE over, son, and let the Instructor in on the conversation. And stop nibbling on that cracker—he has some real food for thought.

Now who's the Instructor, maybe you're asking. Some folks say he's a run-down model builder who talks too much; while others contend he's nothing more than an over-rated stop watch pusher. But anyway, he's willing to let you judge for yourself. The editor of MODEL AIRPLANE NEWS is kind enough to permit him to climb up on the cracker barrel once in a while, so here goes.

The topic of our sermon today is "waste." Let's put that in capital letters: WASTE! We think that America has been a land of wastefulness and that model aeronauts and their friends have been just about the most wasteful of the lot. And that includes manufacturers, too—and hobby shops! And M. A. N. readers!

Boy, is the Instructor wound up this time!

Here is what we're complaining about. And it took a war to wake us up. We think that too many brains, too many good ideas, too much materials, and too many facts are being wasted by the model airplane designers, builders and flyers in these here United States.

Let's start off with the model builder, just to keep everybody happy. First of all (and all of this applies to the past, before the outbreak of World War II and shortages of some model plane building materials and supplies), we modelers wasted wood by not figgering out how economically we could cut out wing ribs, stab tips, wheels, formers and so on, from a minimum number of pieces of sheet balsa. Oh, there's plenty more, was our excuse. But what fine practice we were getting for the day when we might be working in an aircraft factory and had to lay out fuselage formers to get the most out of the least amount of stock.

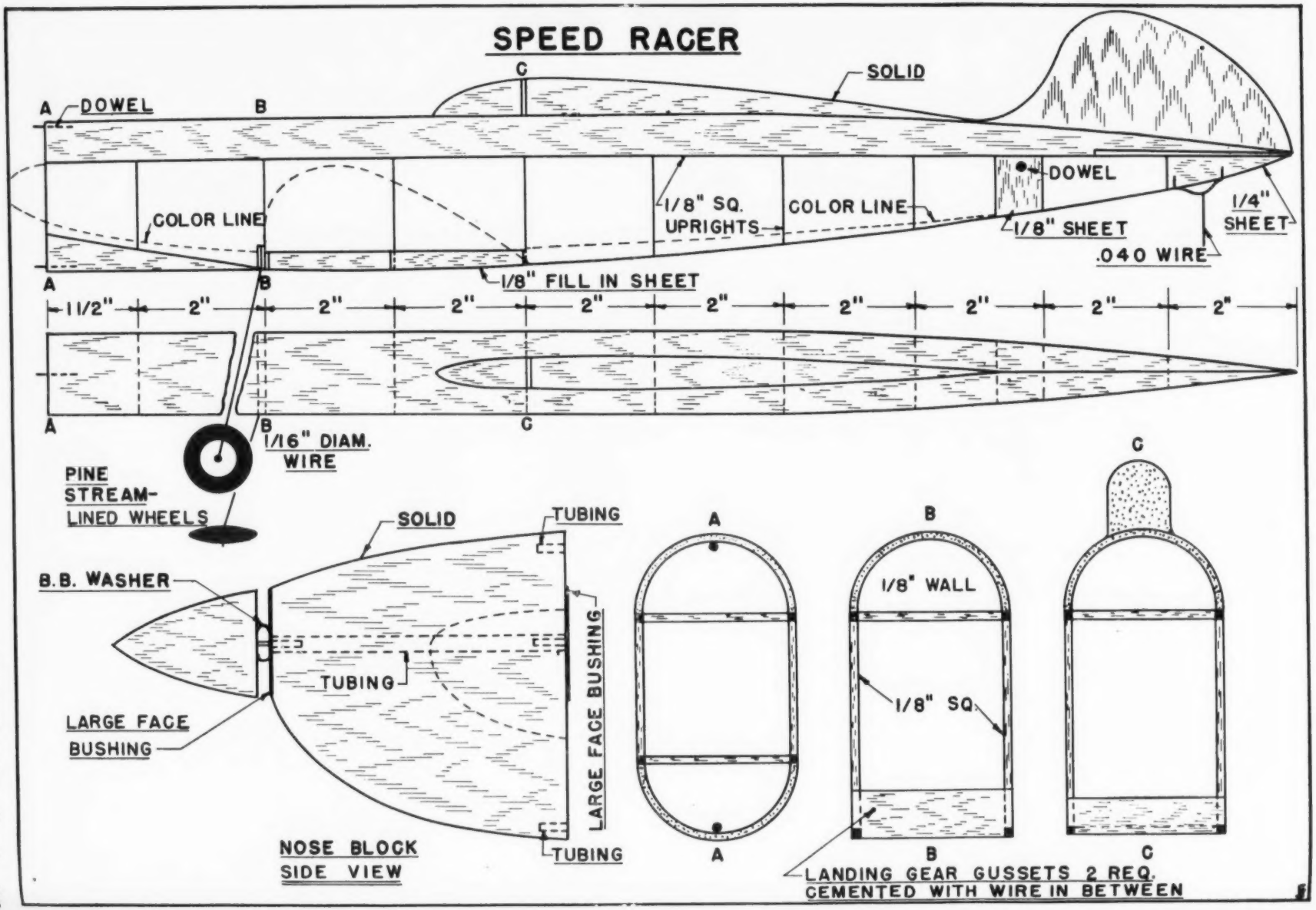
Don't waste materials, fellers, it's not patriotic and it's not good sense anyway!

Another way we have been wasteful is in checking with existing reports and data before going ahead with original designs. Take the articles on how to design, adjust and fly models which have appeared regularly in MODEL AIRPLANE NEWS during the past years. Did we benefit from wise words, or did we wreck our ships by using the trial and error methods instead of a procedure resulting from understanding the principles behind good adjustment and good flights?

Sure, it's all right to experiment, and

(Continued on page 31)

SPEED RACER


A
DOWEL
B
C
SOLID
COLOR LINE
1/8" SQ.
UPRIGHTS
COLOR LINE
DOWEL
1/4"
SHEET
1/8" SHEET
.040 WIRE
1/8" FILL IN SHEET
1 1/2"
2"
2"
2"
2"
2"
2"
2"
2"
2"
1/16" DIAM.
WIRE
PINE
STREAM-
LINED WHEELS
SOLID
TUBING
B.B. WASHER
TUBING
LARGE FACE
BUSHING
LARGE FACE BUSHING
TUBING
NOSE BLOCK
SIDE VIEW
A
A
B
1/8" WALL
1/8" SQ.
B
C
C
LANDING GEAR GUSSETS 2 REQ.
CEMENTED WITH WIRE IN BETWEEN

WINGS OF MERCURY

Complete data for building one of the fastest, most stable and most durable models that ever flew

by **FRANK EHLING**

WHY not more speed models? They always draw a crowd whenever flown. They are not hard to build yet are few and far between. Here is a good sound design that ticks over at record speed. The clean design, combined with the correct aeronautic layout, makes it perform peaceably like Clyde Beatty's lions.

The Mercury racer was designed with the knowledge gathered from other ships that were built, and the layout was obtained from MODEL AIRPLANE NEWS articles, "Designing Your Models, For Speed," to which we are deeply thankful. For complete data see page 375 of "Model Airplane Design and Theory of Flight" by Charles Hampson Grant.

Those who were on hand when the ship performed for the first time saw a ship that literally flew right off the drawing board.

Though duration is short, the ship is as steady as a streamlined brick flying through still air, with the stamina of a vacuum cleaner salesman.

Enough sales talk, now for actual construction. The wing, tail and rudder are made in the same manner as a hand launched glider. The body consists of a simple framework, and balsa blocks are used for streamlining. The prop is carved from pine, and the power is 14 strands of 1/4" flat. Do all testing over grass as this will save the life of the ship.

So here we go with a little cement, balsa and paper along with some good workmanship, and before you can think twice we will have the ship ready for flight.

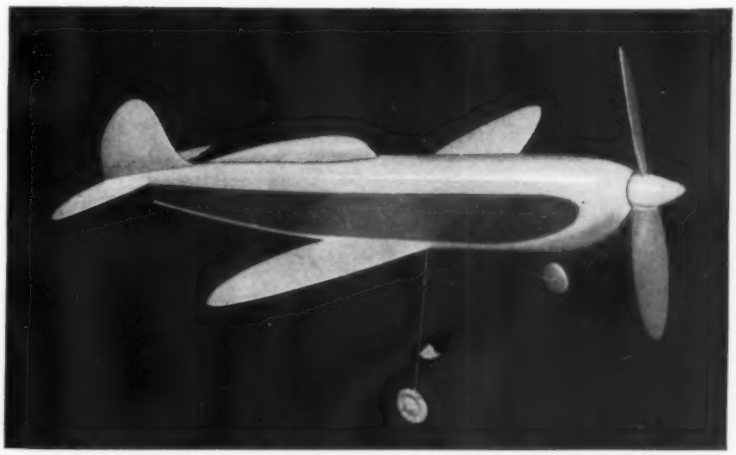
BODY—Start by laying down two sides and when dry remove from the drawing and put in the proper cross pieces top and bottom. The balsa blocks can be cemented lightly on top and bottom and shaped, then they can be removed and the top block can be hollowed out till the wall is 1/8" thick as this takes part of the strain given by the rubber motor. When this is done cement the turtle back on firmly. The bottom cowl can be hollowed to 1/16" and cemented in place to streamline the front of our racer. Bend the landing gear to shape and cement between two 1/8" sheets as shown and cement in the fuselage.

The nose plug is now carved. This is left solid as the weight is needed in the nose and the extra strength is essential when the ship is wound to the limit. The headrest can be added if desired. Fill in as shown on plan with 1/8" sheet and drill hole to accommodate 1/4" dowel; used instead of a wire rear hook. The large diameter prevents the rubber from breaking when tightly wound. The prop shaft should be well insulated with rubber tubing for the same reason. Cover the remainder of the ship with tissue.

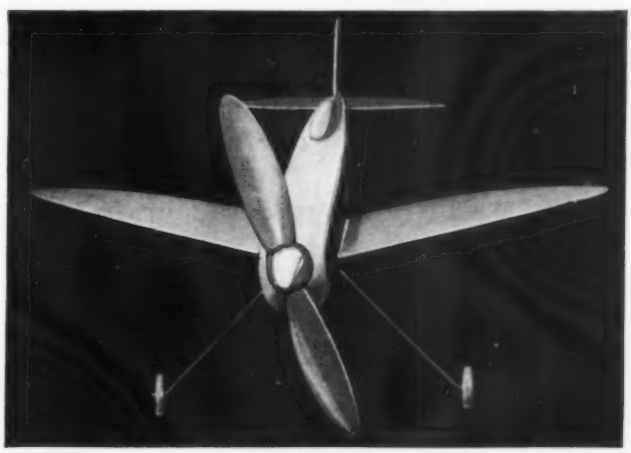
Dope the whole ship and sand; repeat until the ship has a fine smooth finish. Wheels can be made from pine or can be purchased.

The prop is a very important item on a speed job as it turns over so fast, and it must be carved true and finished smooth to obtain maximum efficiency. Carve it in the usual manner after it is blanked out as shown; use 1/16" diameter wire for

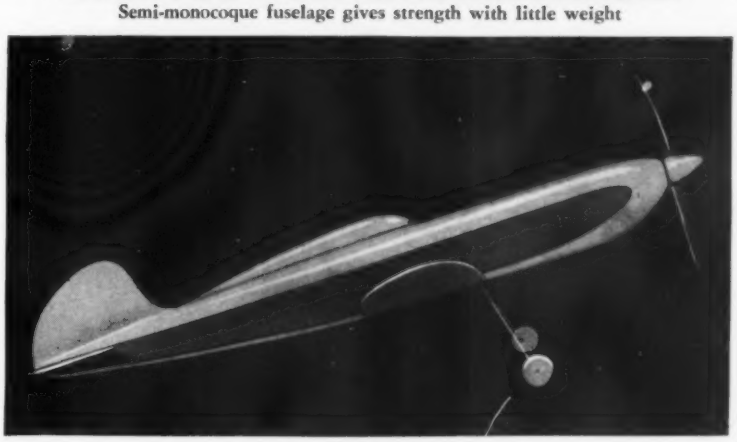
(Continued on page 31)

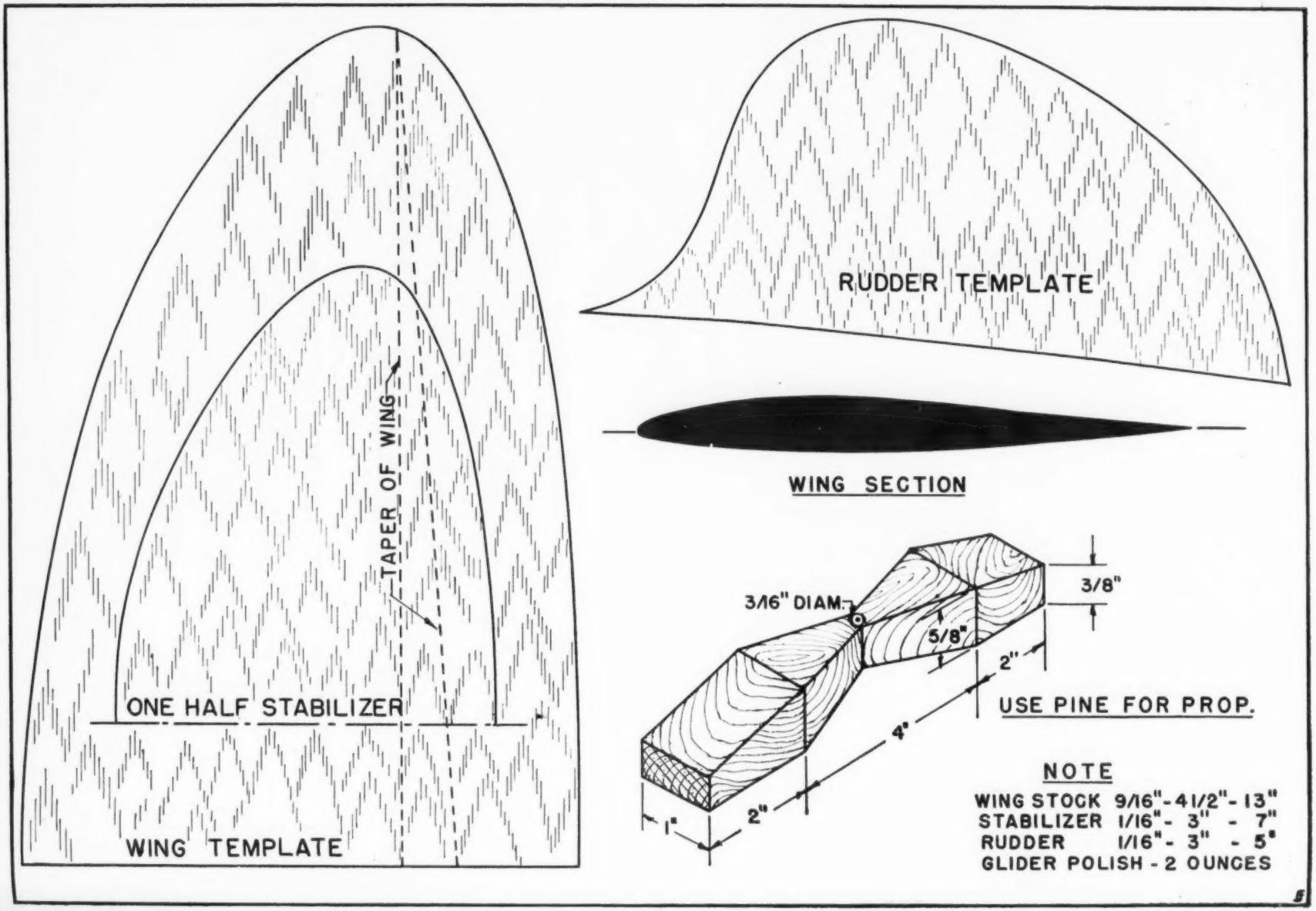


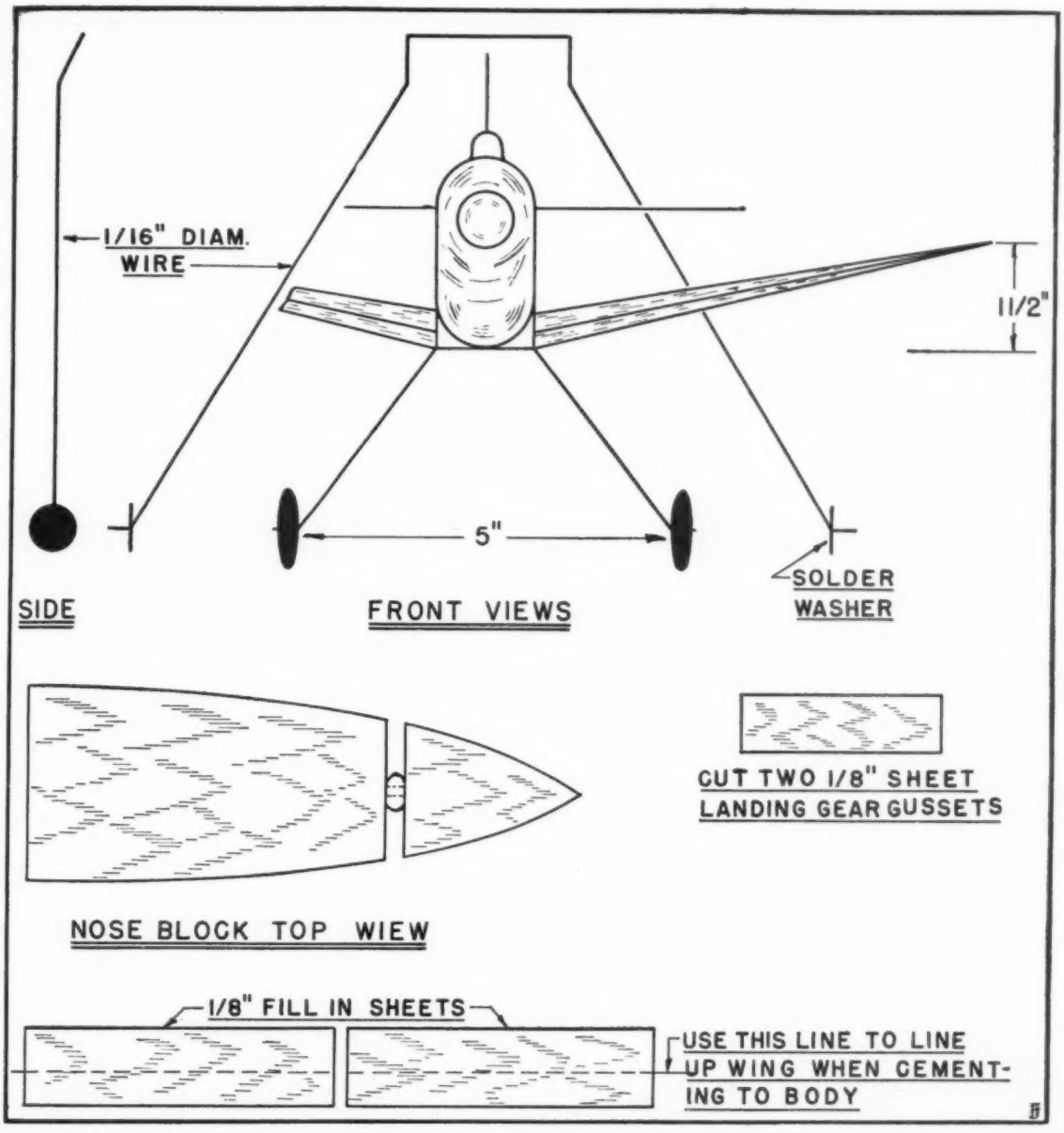
With solid balsa wings, long sleek fuselage and correct thrust-drag arrangement it flies fast and straight



Semi-monocoque fuselage gives strength with little weight




TAPER OF WING
ONE HALF STABILIZER
WING TEMPLATE
RUDDER TEMPLATE
WING SECTION
3/16" DIAM.
3/8"
3/8"
2"
4"
2"
1"
USE PINE FOR PROP.
NOTE
WING STOCK 9/16" - 4 1/2" - 13"
STABILIZER 1/16" - 3" - 7"
RUDDER 1/16" - 3" - 5"
GLIDER POLISH - 2 OUNCES



Wings of Mercury

(Continued from page 29)

shaft. Use no slack because this lessens power.

The wing and tail assembly are made like any hand launched glider. Follow the airfoil for the wing and use a streamline section for the rudder and stabilizer. When the surfaces are all smooth and polished, cement the wing and tail in place.

Those who doubt the strength of this arrangement can only be referred to the punishment that a hand launched glider receives during its initial flights.

Power is supplied through 14 strands of 1/4" flat. Lube the rubber well because it can make the fuselage look sick if it breaks.

Flying is done over high grass or what the farmers call hay; this saves the ship while testing. If the model is tail heavy add some weight to the nose block, and vice versa if nose heavy. Place the wing in the position shown on plans. When flying outdoors and it is a bit windy, to determine the speed, fly with and against the wind and take the average for a fair record.

VICTORY

The Instructor Says—

(Continued from page 27)

we certainly encourage it; but we modelers are dopes if we waste a lifetime trying to invent a mousetrap that has already been patented and in large scale production for twenty years.

In other words, find out what other folks know about the same subject. Check their work, that's fine, but don't spend years trying to do something that a trip to the public library and reference to a textbook will clear up immediately.

By the way, have you read any books on aeromodeling? Or do you think you know it all now?

But back to our sermon on *waste*. Don't waste your own time and opportunities by blindfolding yourself to the facts which have already been laid down: the laws which have been discovered!

To the hobby shops and the model dealers of the land. And we're glad to say that this doesn't apply to all, but it does to too many. Model dealers have been wasting customers ever since they started in business. Driving away business and killing off interest in the activity. How? A little reflection will tell

(Continued on page 37)

SCIENTIFIC—for OUTSTANDING DESIGN . . .

ALL THE THRILLS OF GAS MODEL FLIGHT!
They look, fly and sound just like Gas Models!

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$1.95
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Wingspan .....36"
Length .....28"

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Vultee

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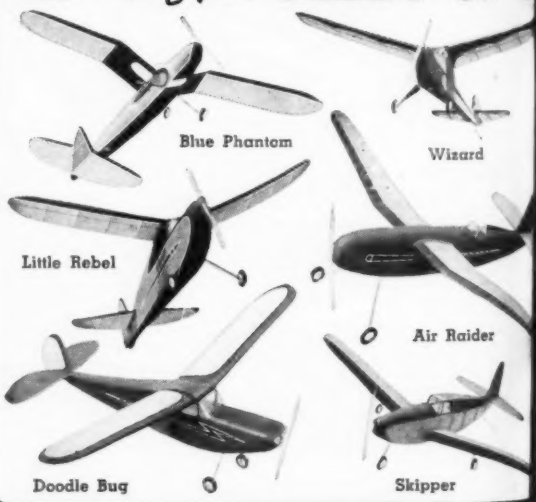
$1.00
Postpaid or at your dealer
Wingspan .....45"
Length ..... 34¼"

25" *Wingspan* FLEET OF C



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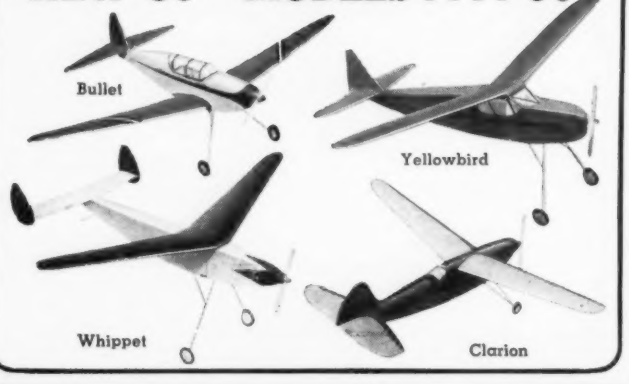

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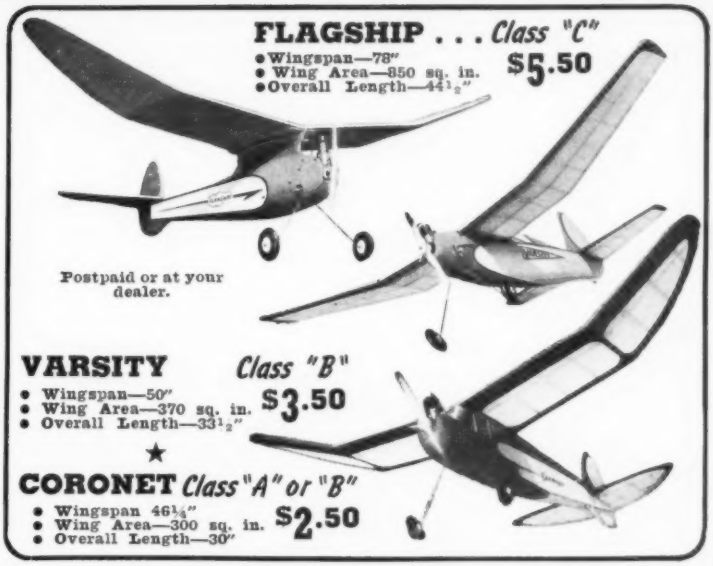

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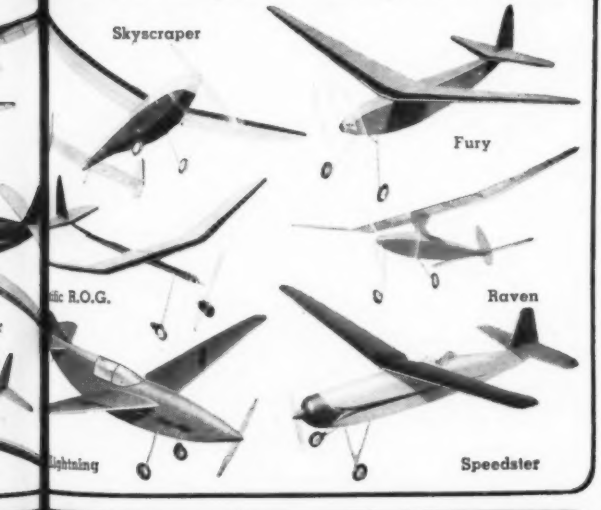

PARACHUTE PLANE

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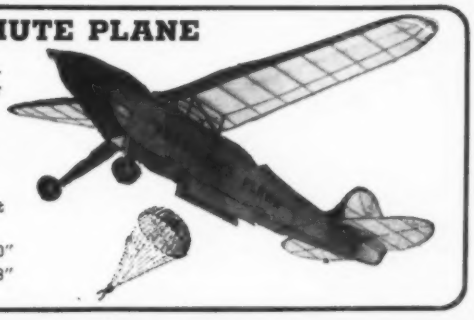
Wingspan .... 40"
Length ..... 28"



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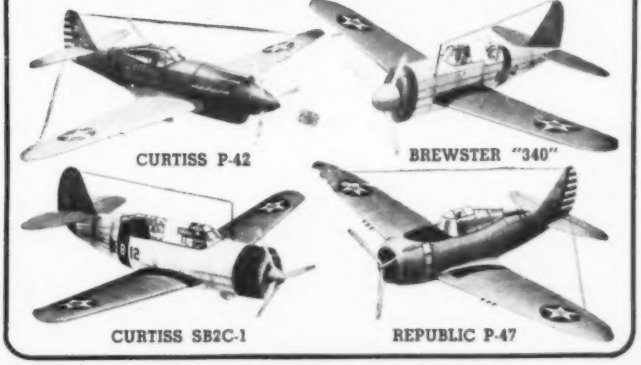

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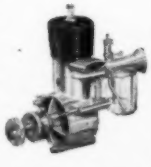

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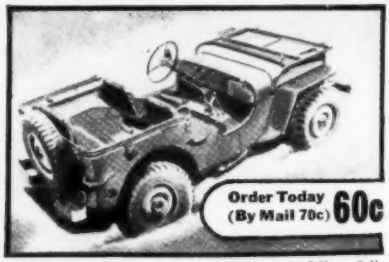

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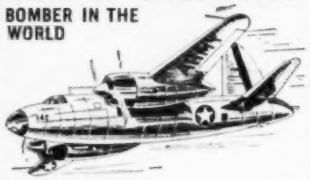

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Army "Grasshopper"

(Continued from page 15)

fuselage frame or basic foundation. Build one side and allow the cement to set. After the cement has set, do not remove from the plans, but build the other side directly upon the first side. Thusly you are assured of two identical sides. Remove the two sides from the plans and join together starting first from the rear and center portion and working toward each other. Make sure the two sides are curved the same amount and in line otherwise your model will have a tendency to keep turning in one direction in flight.

Cut all the necessary fuselage bulkheads from 1/16" sheet balsa as shown in Plate 4 and cement in proper locations. Make the motor mounts from 1/4" x 3/8" strips of bass wood. Anchor it firmly with cross members and fill in around the mounts with 3/16" sheet balsa and loads of glue. The nose and cowling is made from balsa blocks cut to the required shape and crossection. Five blocks are necessary, one for the top cowling, two for the sides, one for the bottom and one for the very front. These blocks will vary in size depending on the size and type of motor you use. If it is necessary to alter the size of the nose to fit your motor it will not affect the model much at all as long as you keep the general shape, crossection and thrust line.

Cut the blocks roughly to shape and then glue in place. Final shaping and sanding is done after the motor is mounted. Use blocks of very soft and light texture and you will not have to hollow out too much. Make a portion of the top cowling removable so that you can gain access to service and adjust your engine. For the sake of appearance you should mount your engine inverted.

Two F2 pieces are cut from 3/16" sheet balsa and cemented in place. F1 is carved from a small balsa block to fit under the leading edge of the center section and is cemented to the fuselage as shown in the plans. This forms somewhat of a cradle for the wing to rest upon.

The landing gear is now made and installed. All dimensions are given in the plans. Use a good quality 1/16" steel music wire. Install the landing gear in the proper location and bind with heavy thread and cement to the fuselage longerons and cross members. Bind the three struts together at the axle point with thin flexible wire and then apply enough solder to make a very solid joint.

Now add all the 3/16" sheet balsa gussets all around the landing gear-fuselage connection as shown in the plans for extra strength. Fill in the landing gear struts as shown with very hard 3/16" sheet balsa. Cut and trim this fill-in to a symmetrical crossection.

It is advisable to use 2-1/2" diameter air wheels. Use air wheels rather then sponge or wood wheels to obtain the best shock absorbing action. A lump of solder at the end of the axle will keep the wheels in place. The tail wheel is a 1" diameter sponge rubber wheel. Bend the strut as shown from 1/16" diameter steel music wire.

Cut three bottom fairing stringers from 1/8" sheet balsa and cement in place. Add the 1/8" round hardwood dowel to act as rubber hooks to retain the wing and tail group in place.

Tail Group

The rudder and stabilizer are very simple to construct and you should find no difficulty with them. A full size drawing is needed to work upon.

Cut all the necessary curved parts from 3/16" sheet balsa as shown in Plate 3.

Pin the stabilizer's leading edge and center spar of 1/4" square balsa directly on the plans. Trim the 3/16" x 1/2" trailing edge to the correct shape and crossection and pin in place on the plans. Now cement the 1/8" x 1/4" ribs in place. Add the stabilizer tips in place. Note that the stabilizer is made in one piece, the 1/4" sq. center spar running the whole span of the stabilizer, 18-1/2".

The rudder is made in the exact same manner as the stabilizer. The tip, R1, and trailing edge are placed in the center of the spar and ribs to form a symmetrical section, however. Check stabilizer and rudder for warps.

The rudder and stabilizer are cemented together after they are covered and form a separate unit, detachable from the fuselage. It is held in place to the fuselage by strands of rubber wrapped around 1/8" dowels.

THE INGENUITY of American Youth CAN'T BE LICKED!

THE BUILDING of model airplanes makes a fellow skillful and ingenious. Take his favorite material, balsawood, away and he will still go right on building more and better models every day.

The use of balsawood in model airplanes has been restricted, but Uncle Sam doesn't want you to stop building models. In fact, he needs thousands of model airplanes and he is anxious that you keep right on developing your skill. All he asks is that you contribute to the war some of your ability and ingenuity by finding and using other materials, so that he can have the balsawood for life rafts and other war essentials.

Megow foresaw this situation months ago, and Megow engineers have re-designed Megow models so that their lightness and other advantages will be maintained. They show you *how*—and all that is required from you is a little more time in construction. The main thing is to KEEP THOSE WAR MODELS COMING THROUGH!

A large part of the Megow plant is now engaged in war production, but the production of regular lines is continuing. If an occasional delay occurs, we feel sure our dealers and customers will understand that war needs come first.

Send 15c for catalog and special information on these new Navy models designed for identifying warplanes.

MEGOW'S "SPOTTERS' SPECIAL" WARPLANES

Forty of the best-known warplanes of all the largest warring nations—American, British, Russian, Italian, German and Japanese. Each kit includes printed wood, cement and black paint, and a detailed plan drawn according to Navy requirements. Priced at 20c to $3.00.

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JASCO-PINE

● Did you try JASCO-PINE last month? How did you like it? Bet you were surprised to find out how easy it is to work with it. One of the boys made a "C" Gas job with JASCO-PINE and found that it was overweight only one ounce. Powered with Comet 35 it did 2½ min. on 12 sec. M.R. during a normal flight.

JASCO-PINE is about twice as heavy as hard balsa. Sheets up to 1/16" can be cut with razor blade into ribs and bulkheads. Ordinary clear cement will do. Stock is cut to exact dimensions, smooth and from A1 quality lumber.

● We wish that we could charge same prices for JASCO-PINE as we did for balsa, but JASCO-PINE costs us about 50% more, strange as it may seem. So please do not compare prices. Quality is never expensive, especially when it is so hard to get it in model supplies. Our regular customers know that JASCO has always been least expensive when all is said and done.

36" JASCO-PINE SHEETS (1¾" Wide)

1/64	8c	1/16	8c	5/32	12c	5/16	16c
1/32	8c	3/32	10c	3/16	12c	3/8	18c
1/20	8c	1/8	10c	1/4	14c	1/2	20c

36" JASCO-PINE STRIPS

1/16 sq.	1½c	3/32x1/2	3c	3/16x5/8	5c
1/16x1/8	1c	1/8 sq.	1½c	1/4 sq.	3c
1/16x3/16	1c	1/8x1/4	2c	1/4x3/8	3½c
1/16x1/4	1½c	1/8x3/8	3c	1/4x1/2	4c
1/16x3/8	2c	1/8x1/2	3½c	1/4x5/8	4½c
1/16x1/2	2½c	5/32 sq.	1½c	1/4x3/4	6c
3/32 sq.	1c	3/16 sq.	2c	5/16 sq.	5c
3/32x3/16	1½c	3/16x1/4	3c	3/8 sq.	5c
3/32x1/4	2c	3/16x3/8	3½c	3/8x1/2	6c
3/32x3/8	2½c	3/16x1/2	4c	1/2 sq.	7c

48" JASCO-PINE STRIPS

1/8 sq.	2c	3/16 sq.	3c	5/16 sq.	6c
5/32 sq.	2c	1/4 sq.	4c	3/8 sq.	7c

36" JASCO-PINE TRAILING EDGES (Beveled)

3/8x3/32	3c	5/8x5/32	5c	7/8x5/32	7c
1/2x1/8	4c	3/4x3/16	6c	1x1/4	8c

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G-M 10 each 3 for 25c Light 0-0 .....5c each

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2 oz.....15c 4 oz. .....25c 8 oz.....40c

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SEE PAGE 43

Latest Developments in

RADIO CONTROL

A booklet written for the radio control beginner as well as the expert. Features—"The theory of the RK-62 receiver"—"Control devices"—Table of A and B batteries—A comparison of the electrical and mechanical qualities of bakelite, steatite and polystyrene—Self-neutralizing escapement—sequence solenoid—rubber powered selector—rubber powered indicator—"Radio Control Circuits," an article written in answer to the questions asked in the thousands of letters received by us during the year 1941. Eighteen different radio control hook-ups with hook-up diagrams.

Ask your dealer or send twenty-five cents for Illustrated Instruction Manual. Stamps will not be accepted.

Radio Control Headquarters
P. O. Box 214 Deal, New Jersey

Wing

Although the wing is very easy to construct, care must be taken to avoid any warps. First make a full size drawing of both halves of the wing.

Cut the wing tips from 1/4" sheet balsa as shown in Plate 3. Cut the required wing ribs medium 1/16" sheet balsa.

Trim the 1/4" x 3/4" trailing edge to shape and pin in place on the plans. Pin the 3/16" x 3/8" rear spar and the 3/16" x 5/8" front spar in place. Insert the ribs in their proper locations and cement. Now add the leading edge of 1/4" square balsa. Note that the leading edge is set on edge. Cement the wing tips in place. The 1/8" sheet balsa wing strut base may now be added in place.

Install 2-3/4" dihedral in each wing tip. Note that the center section is flat. Gussets and braces should be added at the dihedral joint for extra strength. Check the wing for any warps.

Cut the wing struts to size from 1/8" sheet hard balsa. Two are required.

Covering

It is advisable to use colored Silkspan for covering rather than color doping the model. Choose a regulation Army color. Use heavy clear dope as an adhesive. Sand the frameworks lightly to remove any flaws and ridges that might mar a neat covering job.

Cover the fuselage first using one piece for each side and bottom. Several pieces are required on the turtle-back. The cowling and similar wood parts such as landing gear struts are tissue covered, too. Use a separate piece of paper for the top and bottom of each section of the wing and tail surfaces. Once all parts are covered lightly spray them with water to tighten the paper. Then apply two or three coats of clear dope with a brush. Cover the cabin with heavy sheet celluloid.

All items such as cowling details, insignia, control surface outlines, etc., are made from colored paper. The wing struts are colored with black dope. The wing struts are held in place on the fuselage and wing by small bamboo pins pushed through the wood. These shear off in case of collision. The wing struts are installed in place only after the wing has been strapped in place to the fuselage with rubber strands.

Flying

After completion of the Taylorcraft check the model surfaces for warps. The Taylorcraft wings and tail are constructed solidly enough to resist warping, but if warps do occur take them out. Initial flights of the original model proved airworthiness, and by carefully making flight adjustments championship performance will result. The wing is set at plus two degrees and the stabilizer at zero. There is no down or side thrust required for the motor.

Glide the ship several times putting more or less incidence into the stabilizer. Remember that careful slow adjustments save much time and effort later.

Set the timer between 10 and 20 seconds for the first flight and use very low power. Launch the 0-57 and watch the flight very carefully. Under power your Taylorcraft should climb in approximately 100 foot circles to the right. When the motor cuts, it should gradually turn to the right and glide in two hundred foot circles. Each model may have individual flight characteristics but all jobs such as this one should climb to the right under power, and glide to the left. If the ship reacts well on the first flight, fly it again with the same power and motor run. The ship should be flown about ten times, gradually increasing the power to the maximum.

If you have followed instructions, and are not afraid to open your engine wide, you now have a perfectly flying scale gas model that will afford you many hours of satisfaction, and what's more, an excellent chance to win in the next local contest, whether it is an endurance or scale event.

VICTORY

Sky Scouts

(Continued from page 27)

page 27 of this issue.

Anyone wishing to qualify as a Sky Scout must make a list of the names of planes in each series as they are published after reading the accompanying descriptions and send each list to Sky Scouts, c/o MODEL AIRPLANE NEWS, 551 Fifth Avenue, New York, N.Y. When two sets of names have been received the candidate qualifies as a Sky Scout and receives a silver Sky Scout pin. When a complete set of twelve have been received at headquarters the Sky Scout becomes an Expert Sky Scout and receives a gold pin. Then, having completed his course of training, he will be given a membership card indicating his qualification as a full-fledged member of the organization.

Names of Expert Sky Scouts will be sent to defense headquarters with a statement of their qualifications for assisting in the national defense.

You can start the course at any time, with this Lesson 10, for example. All twelve lessons must be sent in to headquarters to qualify for Expert Sky Scout. You may have missed some, but this will not prevent you from qualifying because after all the twelve lessons have been printed, the entire twelve will be reprinted in one or two issues of this magazine. You can then list the ones you have missed and send them in.

Many Sky Scouts have found it helpful and interesting to form units or clubs where there are several Scouts in a community. One such unit in Brooklyn, N.Y., of which Simon Waitzman, 564 E. 53 St., and David Tuman, 566 E. 53 St., are leaders, is taking steps to establish a spotting post on the roof of a tall building in the vicinity. Other units can establish such posts and have regular hours for duty as spotters.

In such cases a report should be filled in for every plane spotted, and a complete file kept of all such reports. They may prove to be invaluable to defense authorities. Notice can be sent to local defense headquarters notifying them that this record is available to them.

★ ★ ★ ATTENTION! ★ ★ ★

MANUFACTURERS! JOBBERS! DEALERS!

Are you closing up your business "for the duration" for lack of merchandise to sell, or because you are to be drafted?

If so, you may wish to dispose of all or part of your store, stockroom or manufacturing plant. We are in the market for finished (or partly finished) kits, model parts, tools and dies, and equipment for manufacturing model airplanes, gas motors, race cars, C-D and HO gage railroad equipment, ships, etc. Will also consider close-out items, if in good clean saleable condition.

WE ARE INTERESTED IN PURCHASING

anything from one machine, or die, or few pounds of materials right up to a complete shop. If you have any clean saleable stock, or finished parts—like wire of music or spring temper, either in rolls or straightened and cut to length—or in hooks, balsa propellers of all sizes, also strips, sheets, blocks, etc.—silks or covering tissues—bottles, caps, cans, tubes—finished and unfinished kits or parts for kits, such as boxes, drawings, artwork (including previously unmanufactured designs), special parts, etc.—write and tell us so. Mention anything else along these lines, which you think we might be interested in buying. In your first letter, send marked catalog, or list of materials, and give lowest acceptable cash price for well-packed shipment "collect". Also send samples where necessary and state quantities. Send photos, if possible, of machinery and equipment, regardless of whether it is standard (state make) or special equipment and state its condition. State make, h.p. phase and cycle ratings of motors.

On any "frozen" material, we will obtain special releases from WPB to purchase, or transfer, before negotiations are completed.

BUT—PRICE MUST BE RIGHT!

Tell us what you have to sell—quote us your very best price—give us the right to inspection—we're in position to close the deal promptly for cash, but all items must be free and clear of any encumbrances. Remember—we will buy a pound or a carload of merchandise, or one tool or die to a complete shop—so get in touch with us AT ONCE. (Or clip this ad for possible future reference.)

CLEVELAND MODEL & SUPPLY CO., Inc., 4508B110 Lorain Ave., Cleveland, Ohio

★ ★

At club meetings Scouts may test their efficiency as spotters by pinning pictures or silhouettes of various planes on the wall and then compete in their identification, either orally or by writing out the answers. Each Scout then can be graded on his accuracy and prizes given to winners.

VICTORY

The Instructor Says—

(Continued from page 31)

you how. By selling the wrong item to the wrong person. You know the gushing aunt who wants to buy Junior a model-plane kit. No, he's never built a plane before. So the salesman convinces the old gal that a $15 kit and a $25 motor is just what Junior needs, when it's really a couple of good R.O.G. kits and a couple of books that will do Junior the most good. The old penny pinching technique all over again.

Sure, the salesman made a nice sale and maybe a good bonus; but there's one recruit that's lost to aeromodeling (and incidentally, to the hobby store as a future customer) for all time.

So, get wise, Mr. Model Dealer, if you qualify as the example (and we hope you don't). Treat your customers in relation to how much experience they have had building models, rather than from the standpoint of how much cash they have in the pocket. You'll find that it pays off in the long run.

That brings us to the manufacturers, doesn't it? And we're referring to kit manufacturers, rather than motor manufacturers.

Our great gripe with the model manufacturers has been that they never provided enough instructions or materials for the average builder. That condition is being remedied, thank goodness. But it took Mr. Hitler (boo!), the war and America's air conditioning program to convince some of the fellows.

Years ago manufacturers of model-plane kits really went to town on instructions. But as competition became keener, display boxes bigger (the manufacturer with the biggest boxes frequently got the order because it looked as though the buyer might be getting more for less), and materials less and less, most of them got away from this.

As the manager of one of the largest concerns said to us recently: "It really took the Civil Aeronautics Administration-U. S. Office of Education Joint Aviation education program to make us see the light. When the school teachers started coming around and asking questions, demanding better instruction, visual aids and illustrated plans, we began to get the idea."

And how right he was. Think how many "repeat" customers the industry has lost over a period of years because there were too few materials, or just plain mediocre stock, or incomplete plans and instructions. And it was a sure bet that if Junior couldn't build the model, neither could his "old man," or all his uncles combined.

So maybe the manufacturers have seen

AND IT WILL PROTECT YOU FOR THE DURATION!

Modelers can avoid ignition failures during the present materials shortage by observing the following precautions:

1. Use batteries that are heavy enough for the job.
2. Don't leave booster on needlessly.
3. Don't run engine unnecessarily.
4. Keep wiring clean and in good condition—especially the leads.
5. Have all parts fastened down solid.
6. Remove batteries when storing ship for any length of time.

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OK

America *moves ahead*

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ON SEA . . .
IN THE AIR!

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•

Herkimer New York

American offensive is gaining momentum . . . as this is being written the glorious stand at Midway is already historic . . . Coral Sea Victory points to new conquests to come . . . "Leathernecks" have thrilled the world with their exploits at Solomon Islands! Soldiers, Sailors, Marines, they measure no sacrifice too high to preserve liberty for themselves—their families—their beloved nation!

AMERICA MOVES AHEAD . . . *on land, on sea, in the air!* The army back of the army—skilled technicians, craftsmen, laborers—MEN & MACHINES—are forging a power to crush the mad ambitions of dictators to enslave the world! We are proud to be enlisted in this world crusade . . . all our facilities, all our manpower are "in for the duration."

'OK' engines possess the precision craftsmanship which is contributing to today's war effort. Sturdy—dependable—powerful—EASY STARTING! Is it any wonder these engines have their own loyal army of followers?

Some dealers may still have 'OK' for your project!

Replacement and Repair Service available at the factory. Send engine or write for prompt response.

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WAR STAMPS AND BONDS

the light all 'round. We do know that many are working on some super-duper ideas in kits utilizing new and non-critical materials.

It looks like a new era in aeromodeling—one where waste is out the window. Let's keep it that way.

It's patriotic to be economical, you know. You can tell 'em the Instructor says so!

VICTORY

Sword of Damocles

(Continued from page 7)

thereby forcing the U.S. to do likewise, the Japs were able to steal comparatively unnoticed into the Aleutian chain with possibly one or two carriers protected by two light cruisers and two destroyers comparatively unnoticed and attack Dutch Harbor. This attack focused our attention on Unalaska, thereby permitting the Japs to land on Attu and Kiska. Probably these landings were made by Marines from the cruisers, with poor weather as a cover. Thus, by using carrier-based air power, the Japs have been able to gain certain objectives which may permit them to utilize the far more deadly land-based bombers for the major assault.

The Aleutian Islands are the birthplace of weather for, due to the manifold rotations and translations of Earth, this region serves as the starting point for high and low pressure areas which cause "weather." These areas move southward to the vicinity of San Francisco, Portland, Oregon turn inland and move across the U. S. passing out over the Atlantic through the St. Lawrence Valley or over our east coast. Thus nature has provided a perfect pathway of tailwinds for the Jap land-based bombers.

Dutch Harbor is most certainly the next logical Japanese target, and more than likely will follow the conventional plan of carrier-based bombers reducing the military objectives, followed by the transports heavily guarded by destroyers and light cruisers. The invasion barges could be sent in while fighters "mow down" resistance on the beach and docks. If Dutch Harbor were under control, the Japs would then be in a most favorable position to launch large scale heavy bombardment attacks on Seattle, Portland, San Francisco and Los Angeles. If the U.S. Pacific Fleet could be occupied in the South Pacific (an attack upon Hawaii and the installations at Pearl Harbor) to an extent making it impossible for units to be dispatched to the West Coast, the way would be clear for the carrier-transport-barge procession to slip down the coast and move inward probably at Vancouver Island, Monterey Bay (south of San Francisco) and Santa Monica (west of Los Angeles).

Two Alaskan outposts stand ready to defy such a plan. Obviously we can say nothing regarding the Naval or Aviation installations at these two important bases, because mystery regarding these two points is a valuable weapon to be used against the Japs.

Dutch Harbor, in the vanguard of our Alaskan defenses, has been attacked twice, to date of this writing—the first attack being made by light aircraft attached to Jap aircraft carriers, during which a small number of bombs were dropped; and the second made by the same type ships as a purely scouting mission, quite probably to survey the extent of "damage."

Paramoshiri is the northernmost Japanese island, lying just across the Kurile Strait from Kamchatka, a Siberian peninsula. Now Paramoshiri is a strategically located Japanese naval and air base lying just 1526 miles from Dutch Harbor and 1250 miles northeast of Tokio. This first distance lies just outside the effective range of Japanese bombing planes. Attu Island, most westward of the Aleutians, lies just 716 miles from Paromushiri and a brief 810 miles from Dutch Harbor. This the plan unfolds: the capture of Attu would neatly halve the distance from Paromushiri to Dutch Harbor, and make possible an easy flight in force on the latter. Thus, carrier-based aircraft were possibly moved to within lazy striking distance of Attu, defenses reduced and Marines sent ashore. Now the picture clears: the Japs now lie just 810 miles from Dutch Harbor, a prime strategic target towards a reduction of the entire Alaskan defenses.

But what about Dutch Harbor? Her needs will be fighter planes, primarily, to ward off the attacker's aerial blows as well as to accompany patrol-bombers on attacks on Attu, perhaps on Paromushiri itself.

Possibly Sitka, strategically, might be considered a reserve fortress in this respect: should Dutch Harbor fall, it could be the prime operating base for both land and sea bombers to attack Japanese-held installations. This double check is a strong one, for the huge PBY types have an effective range of 2,000 miles (4,000 mile range) and can carry more than four tons of bombs (see MODEL AIRPLANE NEWS, March 1942 issue). A single squadron of these giant planes, shuttling back and forth with their deadly loads over the 1250 mile route between Sitka and Dutch Harbor could quickly drive the enemy's supporting cruisers and destroyers either to the bottom or to the West. This, too, would require adequate fighter plane protection, provided by the previously mentioned carrier.

The Japanese position is a strong one, make no mistake. But the American position can be made stronger than the enemy's through suitable reinforcements of land-based long-range bombers from the Combat Command's extensive Alaskan operating base. The situation will most certainly bear watching and its suitable alleviation will require utmost cooperation between Army and Navy bombardment-type airplanes and particularly the carrier-based fighters.

Alaska holds not only the key to the North Pacific, but its situation on the very roof of the world makes it a prime strategic base for operations on the other side of the globe. For instance, Berlin is only 3,480 miles from Fairbanks by airline directly across the North Pole; Moscow only 3,350 miles. Chungking, China, is only 3,740 and New York City is a mere 2,700 miles, its approximate distance from Los Angeles!

The route from Fairbanks to Berlin passes over the northern portion of Greenland and moves straight *down* Norway or Sweden. A slight deviation from a true course and the route passes over Iceland! And Uncle Sam has this Arctic island firmly in hand and has held it, well manned and

MODELCRAFT

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NORTH AMERICAN B25. Faithful solid scale kit, with 16 1/8" span, of the Army medium bomber that has covered itself with glory in the Pacific. Made the first historic raid on Tokyo. Plans show full details for building a beautifully realistic super-solid. No. 1 in any collection of bombers!

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MARTIN B-26

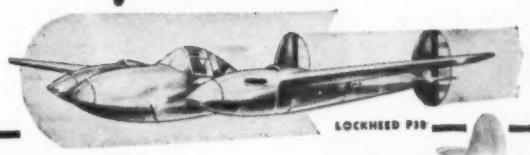
MARTIN B26. This super-streamlined bomber, with the reputation of being the world's fastest bombing plane, has been taking a sizable toll of Jap transports in and around the Aleutians. We predict it will be one of the most famous of all war planes before the war is finished. All parts necessary to build a handsome solid.

HITLER—HERE THEY COME

DOUGLAS A20A. Originally called the DB7, and christened the "Havoc" by the British, the A20A is now being piloted by the Americans in nightly patrols across the channel. Modelcraft engineers "picked it" three months ago. Similarly, we were first with a Lockheed "Lightning," probably the best known American interceptor, terrific for speed. Both kits are 1/4" scale solids with authentic plans and complete details.

Each 60c Add 10c postage

DOUGLAS A-20A



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fortified. From Fairbanks to Rekjavik is approximately 2,500 miles; from the latter to Berlin and other targets in the Reich a short 1,000 miles, all within easy cruising range of American Flying Fortress bombers, the latter distance within medium bomber (North American B-25, Martin B-26, etc.) striking distance. Certainly this places a new light on our occupation of the frigid island.

Thus, the torturous route to Brazil, across the African desert to Egypt and thence into Nazi-held territory, or across to England and thence across the well-guarded Channel skies, is neatly side-stepped in favor of a shorter and less frequented zone.

Operations in this sphere would not be without their difficulties, chief of which would be the normally poor flying weather found within the Arctic Circle. However, weather in these frigid regions lies much closer to the earth than near the equator, and high-flying long-range bombers could easily fly "over" the majority of these low pressure areas with their attendant rain, fog and poor visibility.

An attack upon Tokio, returning to the Pacific, may well be based on the Aleutian Islands for it lies within long-range land-based Flying Fortress range.

The re-capture of Manila (Corregidor) and the Philippines might even be begun by a long-range bombardment of the Japanese installations, originating from Alaska. Although it is some 3,850 mi. from the Aleutians to Manila, and the reduction of Japanese Corregidor, et al can more easily be carried out from Australia, a serious defeat in this South Pacific sphere might make the first course necessary and it is certainly well within practicability.

A serious threat on Pearl Harbor could actually be more easily met from Alaska than it could from the Naval Air Base at San Diego, Cal., as the former distance is only 2,400 mi., the latter closer to 3,000 mi., and the former would permit tail winds the entire distance.

The tactical cooperation between Army and Navy bombers will most certainly determine in a large measure the future efficiency of American air power, and fighters must *never* be left out of the picture, for without them past experience has shown the serious threat to the success of any bombing air raid. This will necessitate carriers strategically placed in the North and mid-Pacific to join land-based bombers on the route, much as the Indians used to gather their force while tracking invaders. Our carrier force is most assuredly second to none in the world as evidenced by the Coral Sea and Midway engagements and more, many more, carriers are on the way.

But all of these possibilities hinge upon the successful repulse of the Japanese threat to Alaska, which is assuredly no easy task. Japanese fisherman and many reserve naval officers have carefully charted the Aleutian waters, bays and inlets for two, perhaps three decades; may even know more of these areas than we, ourselves. But this Air War has seriously impaired the efficiency of sea-borne invasion; and land-based and carrier based bombers, particularly the latter's torpedo-bearing Avengers and Devastators, can mutilate an attacking tank force provided enemy defending fighters can be dealt with successfully.

Also let us concentrate our power; our air forces must not be scattered over the world to impotence. The Alaskan campaign will be won only if we strike the enemy with more powerful planes in greater numbers—NOW!

Certainly no more prophetic, no truer words were ever spoken than when Billy Mitchell gave to Alaska its primary strategic value. . . . Watch closely Alaska!

VICTORY

What's the Glide?

(Continued from page 9)

where L = lift in pounds; p = density of air under standard conditions (0.00237); C_L = the lift coefficient at the particular angle of attack; S = the area of the wing in square feet; and V = its velocity in feet per second.

The drag of the wing may similarly be found by the use of the characteristics graph and the drag formula, which is

$$D = \frac{p}{2} C_D SV^2$$

Facts. It will be noticed that, with the exception of the respective coefficients, the same factors enter into the drag formula as go into the lift formula, and in the same proportions.

Since this is the case, we can compare lift and drag coefficients directly. Thus, if our graph shows us that at a certain angle of attack (1°) the ratio of the lift coefficient to the drag coefficient is 21.5, we know that the actual lift will also be 21.5 times the actual drag. If, then, we want to know the lift and drag which will result from the use of a certain wing at a certain angle of attack, we need only find its lift, using the lift formula, and then, to find its drag, divide this amount by the L/D ratio indicated on the graph for that particular angle of attack.

It will be noticed that the curve of the ratio of lift to drag coefficients (L/D) reaches a peak at +1° angle of attack. This peak (which we may call L/D_{max}) is generally found within 4° plus or minus of 0° angle of attack. The numerical value of L/D_{max} ranges from about 16 to 23, depending upon the airfoil. This means that at its most efficient setting the lift of an airfoil is from 16 to 23 times its drag, the exact value depending upon the particular airfoil under consideration.

The L/D_{max} position of an airfoil is obviously its most efficient angle of attack, so far as flatness of glide alone is concerned. An airfoil gliding at such an angle of attack as will give it a lift-to-drag ratio of 20 will glide 20 feet for every one foot it comes down.

Math. For those who insist upon a proof of this statement, the vector diagram in Fig. 2 is presented. OW represents the lift of the airfoil with respect to its relative wind. OL represents lift with respect to gravity—the actual working lift. OM is the forward-tending component which is overcoming the drag force, OD. For the sake of simplicity, the relative wind and the gliding angle may be considered the same, the difference being negligible anyway. Extending the side of our parallelogram of forces, WM, to intersect AA', it may be shown with a little geometry that the forward

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distance travelled for each foot fallen is proportional to the ratio of OL to OM, which in turn is our old friend L/D. The geometry is presented in Fig. 2a.

Facts. Now, all this is simply a long way of saying that the flattest glide is obtained with the airfoil at its L/D_{max} angle of attack. It indicates, too, that *the gliding angle of an airfoil is exactly proportional to the L/D ratio of the airfoil.*

But, you ask, if the L/D of the average airfoil is between 16 and 23, why does my model have a gliding angle of only 7 or 8 to one?

To answer this question, let's think some more about this concept of the lift to drag ratio. Just what do we mean when we say an airfoil has a lift to drag ratio of 20?

Suppose we have a wing which has to lift a weight of 20 pounds. If we were to pull it along at such a speed that it would lift exactly 20 pounds, with a spring balance between our hand and the wing, we would find that the spring balance showed a "pull" of just one pound. In other words, there would be just one pound of drag. Our wing, then, has an L/D at the particular angle of attack at which it is flying, of 20.

We also know that because of that one pound of drag, the gliding angle of our wing will be 20 to one. In other words, if we launched our wing from a height of 10 feet, it would glide 200 feet.

Now suppose that we attach to our wing a fuselage having a drag of one pound at flying speed. The total drag of the wing-fuselage system will then be two pounds, the lift 20 pounds, and the lift-to-drag ratio, obviously, will be reduced to 10. This, in turn, means that our model will now glide only 100 feet when launched from a height of 10 feet. Just another example of the advantages of streamlining.

Now, to make this thing complicated, suppose that we increase the weight of our plane to 40 pounds, leaving everything else the same. Now we have doubled its weight. Checking back to our lift formula, we see that the velocity will have to increase. It will not double, because the lift increases as the square of the velocity. The percentage increase in velocity would depend upon the speed of the first (20 lb.) model. But what about the gliding angle? *The gliding angle remains the same for a given airplane regardless of its weight.* This is rather difficult for some modelers to picture, since they see the heavier model coming down faster. This is explained by the fact that its forward speed is faster, hence it comes down from the same height and travels the same distance as a lighter model having the same L/D, but does so in a shorter time.

Now let us suppose that we set our wing so that it operates at a higher angle of attack. We see from the formula that the lift will increase if the velocity remains constant, or the velocity will decrease if the lift remains constant. This is simply another way of saying that if the angle of incidence is increased the model will have a slower forward speed.

But what about its gliding angle? We have seen that the longest, flattest glide is obtained at the angle of attack corresponding to the peak of the L/D curve on the graph. It is evident, then, that as the angle of attack is increased above this point the gliding angle will be reduced. It always remains proportional to the L/D of the ship, remember.

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And, finally, what about that all-important factor, sinking speed? This is the speed at which the plane comes down from a given height. It is directly proportional to the gliding angle, and inversely proportional to the forward speed. In other words, a flat glide and a slow forward velocity make for the lowest sinking speed.

Here we run into a conflict, since a high angle of attack makes for a slow forward speed, and a low angle of attack makes for a flat glide. What to do?

Math. Let's see what a little algebra can tell us.

We know that the time which a model will remain in flight is directly proportional to its lift-to-drag ratio and its altitude, and inversely proportional to its velocity.

Putting this into mathematical shorthand, we write:

$$T = \frac{L}{D} \times \frac{1}{V} \times A.$$

Substituting the formulas for lift and drag in the above,

$$T = \frac{\frac{\rho}{2} C_L S V^2}{\frac{\rho}{2} C_D S V^2} \times \frac{1}{V} \times A, \text{ or } T = \frac{C_L A}{C_D V}$$

But

$$V^2 = \frac{W}{C_L \frac{\rho}{2} S}$$

And

$$V = \sqrt{\frac{W}{C_L \frac{\rho}{2} S}}$$

Where W = weight to be lifted (W = L).

Hence $$T = \frac{C_L A}{C_D \sqrt{\frac{W}{C_L \frac{\rho}{2} S}}} = \frac{A C_L^{3/2} \sqrt{S \frac{\rho}{2}}}{C_D \sqrt{W}}$$

Now, before we try to explain what that is all about, let's do one more problem in algebra and get it all over with.

The question to be answered this time is, At what angle of attack will the least power be required to move the wing through the air?

We know that the formula for power required is

$$HP = \frac{D \times V}{550}$$

Substituting the formula for drag in the above

$$HP = \frac{1}{550} (C_D \frac{\rho}{2} S V^2) V$$

And since

$$V = \sqrt{\frac{W}{C_L \frac{\rho}{2} S}}$$

Then

$$HP = \frac{1}{550} C_D \frac{\rho}{2} S \frac{W}{C_L \frac{\rho}{2} S} \sqrt{\frac{W}{C_L \frac{\rho}{2} S}}$$

Simplifying

$$HP = \frac{1}{550} \times \frac{1}{\sqrt{\frac{\rho}{2}}} \times W \sqrt{\frac{W}{S}} \times \frac{C_D}{C_L^{3/2}}$$

Facts. It is time now to interpret these results. Turning first to our time formula, we see that the greatest time is obtained when $C_L^{1.5}/C_D$ is greatest. But our horsepower formula tells us that the least horsepower is required when $C_D/C_L^{1.5}$ is least. $C_L^{1.5}/C_D$ and $C_D/C_L^{1.5}$ are reciprocals of one another, however, so that $C_L^{1.5}/C_D$ *is* greatest when $C_D/C_L^{1.5}$ is least.

In other and much shorter words, the angle of attack which will yield the longest glide in point of time is also the angle of attack which will require the least horsepower. This means that there is just one particular angle of attack at which the wing of an endurance model will give its best all-around performance.

Let us spend a paragraph in celebration. It seems as if the entire science of aerodynamics is composed of compromises. To get a longer time we have to use a slightly flat glide. To get faster top speeds, the designer must sacrifice low landing speed. Every gain in one factor seems to be compensated by a loss in some other. But here, at last, we have two factors which work together, and the model builder gets a break.

Now that the cheers have died down, let's get back to work. The big question now is, Where do we find what angle of attack will yield a minimum $C_D/C_L^{1.5}$ for a given airfoil?

This is going to hurt. The answer is: We can't find it anywhere, as a rule, unless we figure it out for ourselves, using the plotted graphs of C_D and C_L, and plotting the curve of $C_D/C_L^{1.5}$ with the aid of a slide rule or a log table. This has been done for us in the case of the Clark Y airfoil, in Fig. 3. The curve of L/D is also presented, for purposes of comparison.

It will be noticed that the peak of the $C_D/C_L^{1.5}$ curve is not very far from the peak of the L/D curve, and it is always at a slightly higher angle of attack. It will be of some help to remember that the peak of the $C_D/C_L^{1.5}$ curve is usually about 2° to 4° above the peak of the L/D curve.

In actual practice, it is hardly necessary to worry about the exact setting of the wing in this respect. This may sound like heresy, yet it is true. The use of lifting stabilizer and so-called down thrust tend to cause the wing to be set at whatever angle of incidence will cause it to be in stable equilibrium with the rest of the ship.

The facts here presented, however, do suggest a technique for adjustment. Instead of slapping the wing on to the wing mount and heaving the crate into the air, it would seem advisable to make adjustments carefully. First work for a stable glide, starting with the wing set at as low an angle of attack as possible. Then increase the angle of attack gradually, a fraction of a degree at a time, until the ship begins to "gallop" in the glide. Somewhere during the course of such adjustments the point of minimum $C_D/C_L^{1.5}$ ought to be reached. The glide will be slightly less flat, but gliding time will be longer; and that will be IT.

More probably, if the stability of the ship will tolerate any such adjustments at all, the time will decrease as the glide becomes less flat, indicating that the

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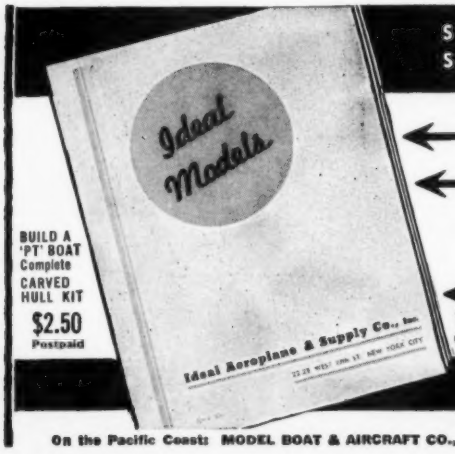

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wing is already set at an angle of attack higher than that for minimum $C_D/C_L^{3/2}$. The only solution then would seem to be a general shifting of weights and rearrangement of settings.

Performance Computation. The formulas through which we have been wading are useful in other ways, too. They provide an extremely simple and rather accurate method of performance computation.

Let us suppose that we have a model weighing three pounds and using a Clark Y airfoil. And, just to make it interesting, let's imagine that our model is fairly well streamlined. (We can dream, can't we?) Let's give it six square feet of wing area and a 1/5 horsepower motor.

Now, the only hard part of our job is to find out what the flying speed of our model is. This we get from the lift formula, solving it for velocity.

$$L = \tfrac{1}{2} C_L S V^2 \qquad V = \sqrt{\frac{L}{C_L \frac{1}{2} S}}$$

Substituting the values for our assumed model:

$$V = \sqrt{\frac{3}{.65 \times \frac{.002377}{2} \times 6}} = 25.4 \text{ ft./sec.}$$

The lift coefficient, C_L, is taken, it will be noticed, at the angle of attack at which $C_D/C_L^{3/2}$ is minimum, or 4°.

A motion picture committee of the Model Industry Association is desirous of locating a print of a film called "Beginning to Fly" which was created by the Airplane Model League of America and the American Boy magazine and which had been available through visual education libraries in different large cities. If any readers know where this film may be obtained, please write Polk's Modelcraft Hobbies, 429 7th Avenue, New York City.

Having found the velocity, it is now a simple matter to see how much power is required for level flight. Since our ship is fairly well streamlined, we can assign it a gliding angle of 8 to one. This means that the ship will have a lift-to-drag ratio of 8 to one. This, in turn, means that the drag will be 1/8 of the lift, or 3/8 lbs. Simple, isn't it?

Now, we saw a little while ago that the formula for horsepower required is

$$HP = DV \times \frac{1}{550}$$

Where D = drag in pounds and V = velocity in feet per second.

Substituting the values for our model:

$$HP = \frac{3}{8} \times 25.4 \times \frac{1}{550} = 0.017$$

This, then, is the horsepower required for level flight.

The total horsepower of our motor is 0.2, and it is about 80% efficient (not 100%, since there is considerable drag from the propeller, which has an overall L/D ratio of about 5 to one.) The total available horsepower is therefore 0.8 × 0.2, or 0.16. From this we subtract the 0.017 horsepower required for level flight, which gives us 0.143 horsepower

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From the day that Lindbergh flew from New York to Paris in 1927 until Dec. 7, 1941, model airplane building, designing, and flying has moved forward by leaps and bounds. In 1934, one gas model flew in the National Contest. In 1941, there were nearly 2,000 entries. In 1935, Berkeley Models introduced the first commercial gas model kit and sold several hundred that year. In 1941, Berkeley Models produced over 50,000 gas model kits. During the same time great advances were made in all other forms of Model Aviation.

But during this time what were our present enemies doing? Model Aviation was government subsidized in Japan and Germany. You *had* to build model airplanes. The government paid for the materials and contest winners were given military recognition.

Thank God that in America you could build models because you *wanted* to build them. You could design them to satisfy your "Yankee Ingenuity" and you could choose from several reputable companies when making your purchase.

Unlike in foreign countries, in the United States only a relatively few public officials ever heard of model airplanes, still fewer thought of their military and educational value.

Yet some of the most dramatic pages in America's history were written by two men whose training for future service to their country began as model builders. Their names, Colin Kelly, and "Butch" O'Hare will live as eternal tributes to American heroism and model building training. The celebrated Davis wing, which has so revolutionized the flying world because of the startling advance it has made in airplane efficiency, was a product of a model builder's workbench. Although many model parts are no longer available because of the essential material they contain, model aviation is forging ahead, making the best of what is still available, happy and proud of its contribution to victory and freedom.

Immediate war needs must be served. Recently the use of balsa for other than life saving equipment was prohibited. Although everyone was allowed to appeal to use up stock on hand, Berkeley Models, without losing any time, turned over the entire stock to a life raft contractor who needed the material badly. Berkeley is now building kits from a combination of pine, poplar, and ba-sswood, using short ends of balsa, left over from life raft production, for small blocks and printed sheets. Kits using a combination of woods prove to be stronger and more durable than all balsa models with a weight increase of only 8%.

BERKELEY'S WARTIME POLICY

At the start of the war we agreed that all prices would be held as low as possible. We considered it our patriotic duty to supply America with the materials it needed at the lowest possible cost. While average kit prices have advanced 25% to 50%, Berkeley prices are the same today as in 1940. We intend to maintain these prices as long as possible. You can help us keep costs down by avoiding unnecessary correspondence. We always welcomed your questions but now must ask you to refrain. Furthermore we suggest that you patronize your local dealer as much as possible. Only when your dealer cannot supply you, order direct.

What You Can Do To Keep Your Models Flying

The main problem today is power for your model whether it be rubber or gas.

Take care of whatever rubber you have. Only a very limited supply of stock is still available. Keep rubber in an air-tight container. Do not wind the rubber more than ⅔ of its limit. At all times remember sunlight is injurious to rubber. Even when flying your model keep the rubber out of the direct rays of the sun. Only ten minutes of direct sunlight will change the chemical composition of rubber thread. Your motor will last longer if you remember these things:

1. Use heavy oil and the best oil you can buy.
2. Do not test run your motor on the flying field. Sand is generally blown by the propeller into the intake manifold.
3. Do not try to get the last ounce of power from the motor every time you fly.
4. Use oversize propellers. They hold down the r.p.m., and give better cooling.
5. Clean your engine with gasoline after every day's flying. When clean, give the entire motor a coat of oil, inside and out.

If for any reason you do not need your motor, sell it to a friend or arrange with your dealer to sell it for you. If there is no dealer near you, write to Berkeley Models, giving the details and we will give you an offer. Particularly needed at this time are O.K. Twins and Forster "99" Motors for government experimental work.

Things To Come!

After victory, a whole new field of model building will open. Motors will be improved, kits will include many new materials, and "Precision Flying" will become the real sport. Think of it, models that will take off, fly a predetermined course and land at the take-off spot, all without the use of radio! But first,—let's win the war.

A FEW COPIES OF THE NEW 48 PAGE BERKELEY CATALOG STILL AVAILABLE

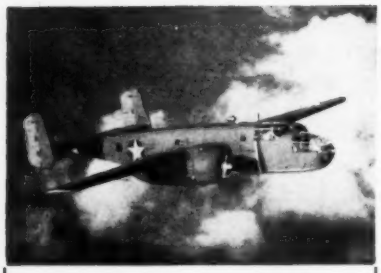
Packed with illustrated facts about new Berkeley kits and hard-to-find equipment, this beautiful catalog is being demanded by model fans everywhere. We don't know how long the supply will last, so get yours today.

10c AT YOUR DEALERS OR BY MAIL.

$500 IN WAR BONDS TO BE AWARDED BY BERKELEY TO LUCKY CONTESTANTS

No American could ask for a grander prize than a United States War Bond. Berkeley has been proud to contribute $500 worth of War Bonds as part of the prizes to be awarded in the A.M.A. sanctioned model meet now being held throughout the country. Good luck to all contestants, and here's hoping that you earn a war bond!

BERKELEY MODELS INC. 230 Steuben Street Dept. M-11, Brooklyn, N.Y.



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OFFICIAL PHOTOGRAPHS
FROM PERFECT KODACHROMES
11 x 14 READY FOR FRAMING

Four beautiful pictures of North American fighting planes, including the famous B-25 that bombed Tokyo, 25c each; set of 4, 60c prepaid. Cash with order, no stamps. Watch for announcement of new pictures. Dept. N-11.

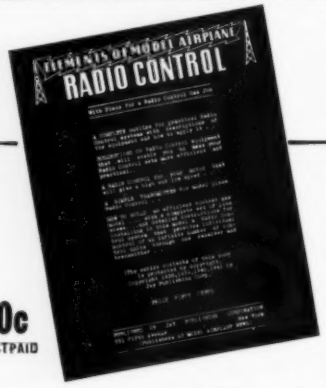
VIRG NOVER
4320 Sunset Blvd., Los Angeles, California

★ ★ ★ ★

RUBBER FANS ATTENTION
New Fall Price List, 5c

Fold-back hinges, rubber tensioners, machined wing ribs, Pin-vises, semi-cut prop blocks, Solvent No. 3, 4 Super Endurance models, and dozens of hard to get items.

BEST BY TEST MODEL CO., 175 Main, Ridgefield Park, N.J.



50c
POSTPAID

HERE is the latest AUTHENTIC data on Radio Flight!

"Elements of Model

RADIO CONTROL"

is an illustrated 28 page booklet that contains a complete outline for the *best* practical Radio Control systems . . . with full descriptions of equipment and how to apply it.

★ IN ADDITION to a thorough and approved course on the subject, this treatise also presents a complete set of PLAN VIEWS with detailed instructions for building an efficient gas model . . . and then equipping it for Radio Control Flight. . . Price 50c

ORDER TODAY

MODEL AIRPLANE NEWS, M 112
551 Fifth Ave., N. Y.
Enclosed find . . Please send . . copies of "Elements of Model Airplane RADIO CONTROL," postpaid.

Name .....

Address .....

City ..... State .....

available for climb.

Since one horsepower is 550 ft. lbs. per second, 0.143 HP is 550 × 0.143, or 78.65 ft. lbs. per second. Since our model weighs three pounds, this means that it will climb $\frac{78.65}{3}$, or 26.21 feet per second.

Just so that we can do that again, let's put the process into a formula:

$$\text{Climb} = \frac{550 \times H}{W}$$

where climb is in feet per second, H is horsepower available for climb, and W is the weight of the model in pounds.

Since our model will climb 26.21 feet in one second, it will climb 524.2 feet in 20 seconds.

This gives us the altitude of our model at the end of its twenty seconds motor run. Now all we have to do is turn to our formula for gliding time:

$$T = \frac{L}{D} \times \frac{1}{V} \times A$$

and substitute in it the values we have found.

$$T = \frac{8}{1} \times \frac{1}{25.4} \times 524.2$$

$$T = 155.$$

The gliding time, then, is 155 seconds, or a little over 2-1/2 minutes. Adding to this the twenty seconds of motor run, we have a total time for the ship of 175 seconds for a flight in still air.

At this point a chorus of booes arises from the audience. "'Tain't so!" they shout. And they're probably right.

This writer believes that it is next thing to impossible to compute the performance of a model with any degree of accuracy, since there are too many variables involved. For one thing, the wing will probably not be set at exactly 4° angle of attack. (Not to be confused with 4° angle of incidence, which is the angular setting of the wing relative to the line of thrust. Remember that the angle of attack is the angle at which the wing meets the relative wind.)

Another disturbing factor in any calculation of performance is that dip at the end of the motor run, caused by the momentary stall and recovery. Then too, who can predict the exact gliding angle of a model not yet built—or even estimate accurately the gliding angle of one already built? The biggest source of error in any such performance calculation, however, is the turn of the model in flight. Much of the lift of the wing is going into maintaining the proper bank, hence such a performance calculation as the above can only apply to a model flying in a straight line.

But we can hope to learn something from making such a performance calculation. First, and probably most important, it gives us a clearer picture of the elements of performance, and shows what factors have been the greatest influence on performance, and are therefore most worthy of attention in the design of a model. Secondly, such a performance calculation should indicate the relative efficiency of the model which is in the process of design. If the computed performance is a little disappointing, it indicates that the proposed design is not the answer, and something else will have to be tried.

Note. The following Technical Reports of the National Advisory Committee for Aeronautics contain graphs and data on airfoils which may be used for performance computations as explained above. They may be obtained from the Superintendent of Documents, United States Government Printing Office, Washington, D. C., for the prices indicated.

124 Aerodynamic Characteristics of Airfoils—30c.

352 Large Scale Aerodynamic Characteristics of Airfoils as Tested in Variable Density Tunnel—20c.

460 Characteristics of 78 Related Airfoil Sections from Tests in Variable Density Wind Tunnel—15c.

628 Aerodynamic Characteristics of a Large Number of Airfoils Tested in Variable Density Wind Tunnel—15c.

93 Aerodynamic Characteristics of Airfoils—Out of print.

182 Aerodynamic Characteristics of Airfoils—Out of print.

244 Aerodynamic Characteristics of Airfoils—Out of print.

286 Aerodynamic Characteristics of Airfoils—Out of print.

315 Aerodynamic Characteristics of Airfoils—20c.

VICTORY

Air Youth

(Continued from page 25)

plus a power loading of 50 ozs. per cu. in. piston would, or could, make a pretty husky model. In such a case, a '60' job would have a minimum wing span of 30" with a total weight of 30 ozs., wing area and wing loading not entering the picture at all. Of course, no cross-section rule at all. I would like to see a thousand opinions on possible rules for tether flying so that this event can be great for 1943. We can hold meets in ballparks within walking distance and it looks like we must walk.

"I felt the so-called 'beauty event' should be discouraged at the average meet unless however some set rules could be established that would make it uniform. Ill feelings have been made many times due to the individual rules for such events. At our South Jersey meets, we judge entirely on workmanship and finish without regard for design or size. Other meets stress design and such regulations work an extreme hardship on judges. If the judge is a world-renown designer, and we like to pick such for a judge, he quite naturally is prejudiced to certain types, you can't get away from that. If he is a large manufacturer, the same applies. It has been our aim to always pick model dealers from out-of-town, if possible, who do not know the entrants. A lady is usually included among the three judges. The lady and in fact many of the male judges used do not know one model from another, but they know good workmanship. I have seen many such judges used in a so-called 'beauty event' which had to pass upon design as part of the event. Adding it all together, we have an event

GRUMMAN F3F1
U. S. NAVY SHIPBOARD FIGHTER

32" Span. Length 24". 1" Scale

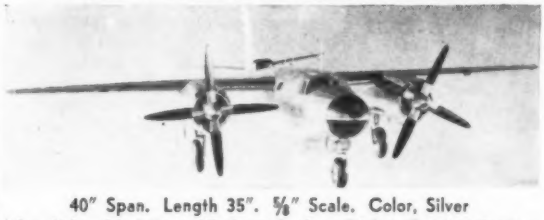
A fine detailed model with retractable landing gear, 4" turned balsa motor front, 3 oz. grey dope, ½ oz. yellow, 2 oz. glue etc., all parts printed on balsa, 10" propeller, wheels, rubber motor, full size drawing, and all parts. This fighter plane is wheels, full size drawing, and all parts. This fighter plane is used in large numbers on the aircraft carriers. Const. Set complete, postpaid. **$3.75**

SEVERSKY P35A ARMY PURSUIT

32" Span. Length 25". 1" Scale. Color, Silver

Set has 4" turned balsa motor front, 10" carved prop, balsa wheels, tail wheel, rubber, all parts printed on balsa, 3 oz. silver dope, ½ oz. black, 2 oz. glue, etc., insignia, and full size scale drawing. New improved model has retractable landing gear and movable controls from cockpit. Set, postpaid..... **$3.25**

NEW MARTIN B26 U. S. ARMY BOMBER



40" Span. Length 35". 5/8" Scale. Color, Silver

A beautiful model of the world's fastest bomber. Set has all parts printed on balsa, propellers, wheels, insignia, 4 oz. silver paint, 1 oz. black, motor fronts, full size scale drawing, and all parts to build. Construction set, postpaid..... **$4.75**

Thousands of this type of plane are fighting for the U.S. and Britain.

NEW BELL P39 AIRACOBRA U.S. ARMY FIGHTER

34" Span. Length 29". 1" Scale

The best detailed P39 on the market. Model has retractable gear, paints, and all parts. Construction set, postpaid..... **$3.50**

All illustrations shown here are actual photos of our finished models. Due to the defense requirements, it may be necessary to furnish harder wood than balsa for some of the parts. We ask your co-operation.

BOEING B-17 FLYING FORTRESS BOMBER

44" Span. Length 30". Color Silver. Weight 6 oz.

Set has all parts printed on balsa, four 2" turned balsa motor fronts, four 4" carved props, celluloid wheels, set of paints, glue, and full size drawing. Set, postpaid **$4.50**

CURTISS HAWK F11C4 PURSUIT NAVY

32½" Span. Length 23¾". 1" Scale. Weight 6 oz. Color grey, top wing yellow

THE MOST EXCLUSIVE AND FINEST EQUIPPED MODEL IN THE WORLD. MOVABLE CONTROLS WORK FROM COCKPIT. A special de luxe model, one of the most beautiful ever made. Set contains a 4½" scale Wright Cyclone celluloid motor, detailed push rods, fins, etc., like real motor, 4½" aluminum cowl, 10" steel type carved prop shown, 2½" wheels, tail wheel, star and rudder insignia and lettering, windshield, instrument board, flying wires, 4 aluminum step plates, aluminum wing walks, ready cut wheel pants, washers, 3 oz. grey paint, ½ oz. yellow, ½ oz. red, 2 oz. glue, etc. All other parts are printed on balsa wood 33"x44" scale drawing. Const. set, complete in labeled box, postpaid..... **$4.50**

9-FOOT TAYLORCRAFT GAS MODEL

9 Foot Span. Length 66". 3" scale

MODEL ¼ SIZE OF REAL PLANE. CAN USE RADIO CONTROL.

One of the easiest gas models to build. Has special wing airfoil for slow landings. Set has ready cut wing ribs, gear struts, nose piece, etc., set of paints, dope, glue, etc. Model weighs 3½ lbs., without motor, suitable for radio control. Lifts 4 lbs. additional weight. Full size scale drawing. Const. set, postpaid, less wheels and motor..... **$15.00**

18" Carved Hardwood Propeller..... $1.50
4½" Trexler Air Wheels..... 2.75

NEW HAWKER HURRICANE

27" Span. Length 21". Weight 3 oz.

Latest version of New Hurrican 4-Cannon fighter. Set has all parts printed on balsa, paints, insignia, full size drawing, and all parts. Const. set, postpaid **$3.00**

NEW CATALOG

Large 6" photos of latest models, gas models, motors, etc.
New Catalog No. 8
Send 10c coin

ORDERING INSTRUCTIONS

Orders sent west of Mississippi, add 15c postage—Foreign, 20c.

CURTISS SO3C1 SEAGULL

30" Span. Length 27". Color grey and yellow

Const. set has all parts, with grey and yellow paints, drawing, and carved prop. Const., set, postpaid **$3.00**

GRUMMAN F5F1 FIGHTER

24" Span. Length 17". Weight 3 oz.

Const. set has all parts printed on balsa, balsa motor fronts, carved 7" props, grey and yellow dope, glue, full size drawing, and all parts. Const. set, postpaid **$3.00**

MINIATURE AIRCRAFT CORP.

83 DANIEL LOW TERRACE
STATEN ISLAND, N. Y.

WATCH FOR NEW
Announcement
of a new line of
Flying and Solid Models
TO BE RELEASED SHORTLY.
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TRANSPARENT
CELLULOSE SHEETING
Weight and sizes ideal for model construction. Price list on request.
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311 Medical Arts Bldg. Dallas, Texas

NOW..
.. YOU can eliminate guesswork!
.. YOU can prevent dives!
.. YOU can make your plane fly straight!
See page 43

Bill Atwood's
CHAMPION MOTORS
back on the market!
Motors and parts *now* available. This is the same sensational motor that is winning meets from coast to coast. Class C-60 Motor Complete..... 18.50 PRE-PAID

Champion Products
4513 E. Gage Ave., Bell, Calif.
Please send prepaid new Champion Class C-60 engine.
Name.....
Address.....

depending too much upon guessing and to further our ideas of constantly creating an improved feeling among the modelers, we for one are dropping the 'beauty.'

"In its place, and with the opinion of every modeler we have contacted, being in perfect agreement, we would like to see a scale gas event. As model building really covers two distinct and different ideas; one to create new, the other to copy the old; it would certainly give plenty of chance for all builders. There is so much chance to improve the performance of scale gas that it seems a good time to start it. What say, gang?

"Let's not have the 1943 regulations come out in 1943. Let's have them full and complete, published and all in December, 1942.

"With balsa stocks gone by 1943 and spruce and white pine to prevail, it seems that power loading could be raised to 100 ozs. per inch with wing loadings of 8 for 'A,' 10 for 'B' and 12 for 'C.' Perhaps 8, 9 and 10 would go over better.

"Stunt events are a matter of opinion. The entries have fallen off since tether flying has started and we may do away with the event as of late it has been costly. We always give awards for first place in all events that are equal in value but with so few entries in many cases it is far from good business. To give twenty-five dollars of merchandise to the winner of one event in which there are a dozen entries at thirty-five cents does not make good sense nor does it teach sound business to younger club members and workers.

"Certainly hope we can have many opinions on the above and again want to impress upon every model flyer in this country the absolute necessity of keeping his model under control in order to 'Keep 'Em Flying'."

Tri-State Model Association Announces Radio Program

The Tri-State Association of Model Airplane Clubs is sponsoring a radio program every Saturday afternoon at 2 p.m. over Station WJPA, Washington, Pa., (1450 on the dial). Mr. Edward C. Delanie, Master of Ceremonies, is working in close cooperation with A.M.A. headquarters in presenting news which will be of interest to model builders and flyers in the western Pennsylvania district.

Among the program speakers have been Squadron Leader Elmer Price of the Pittsburgh Press, Al Williams, one of America's foremost precision flyers, Mr. M. J. Thomas of Pittsburgh, outstanding leader in the youth aviation field, and other prominent flyers and air-minded educators.

Shortly after gasoline rationing went into effect in the eastern coast area, Academy headquarters took on the aspects of a gasoline-rationing board. Letters poured in from frantic modelers requesting ration cards, letters of recommendation, or information as to where they could obtain the now-precious fuel. A.M.A. officials could do no more than recommend that the individual modelers go before their local rationing boards with their appeals.

It has been with much interest that headquarters has received letters from grateful gas model flyers announcing their success in obtaining the small quantity of gas to enable them to carry on their areo-modeling activities for the next six months or more.

Government Loan Fund to be Available for Students

Aeronautical engineering students will be particularly interested in a five million dollar loan fund voted by Congress to help college students speed up training for technical positions. Paul V. McNutt, War Manpower Commissions chairman, in announcing the new fund said that loans will be available only to students registered in specified accelerated programs in degree-granting colleges and universities whose work can be completed within two years. Loans will not be made in excess of $500 a year. Interest rates will be 2 percent per annum, and indebtedness will be cancelled if students are drafted, permanently disabled, or in case of death. All details will be handled directly through the colleges.

Air Youth Leaders Confer in New York

A series of conferences were held in New York City recently between NAA officials and aviation leaders interested in NAA Air Youth activities. The Association was represented by William P. Redding, executive vice president, and Russell W. Nichols, newly appointed Air Youth director. Plans were formulated for an Air Youth section meeting during the two-day NAA Board of Directors meeting arranged for September. The executive committee first will review NAA's youth movement, its work to date, and on the basis of this will prepare an agenda for the Board session.

An "air-mindedness course" for teachers in the elementary and junior high schools of New York City has been proposed and it is believed that one of the instructors for the series may be John B. King, assistant principal of Public School 26 in Brooklyn, N. Y. Mr. King now is serving in an advisory capacity to the Air Youth projects committee and has had wide experience in the educational field as a teacher.

Akron NAA Women Honored at Air Scout Program

Members of the Akron Women's Chapter of NAA were particularly requested to attend the installation ceremonies for the first Air Scout squadron, Boy Scouts of America, in the Nation. Following presentation of the squadron's charter, the chapter members were introduced to the large assembly by John S. Knight, master of ceremonies and editor-publisher of the Akron Beacon Journal. He paid high tribute to the outstanding work done by the chapter in promoting aviation in the Akron area.

Twin Cities Chapter Plans Training Course

Members of the Greater Twin Cities Chapter of NAA, in Minneapolis and St. Paul, devoted a major portion of their July 28 dinner-meeting to discussion of an aircraft spotters training course to be

POLK'S NEW SLOGAN
Conserve and SAVE

BUY WAR STAMPS

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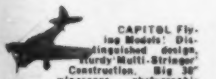
Whether your choice be GAS or RUBBER powered projects, here is POLK'S armful of pleasure-ful flyers! Models which have proven their capacity — representative of foremost designers and manufacturers.

EVE—35" wingspan, weighs 4½ oz. Trim cabin job, ideal for beginners and contest work. Complete BALSA including many extras, less wheels, only **$1.00**

Streamlined MONOCOQUE Rubber-powered flier. All sheet BALSA fuselage, finished prop, wheels, cement, tissue AND ball bearing..... **$1.50**

HAYMAKER—Champion Class 'A' gas job! 33" span, 165 sq. in. area. Louis Garguet's original streamlined engine mount design..... **$1.50**

Scale FLYING models with MOVABLE CONTROL SURFACES! Ready-cut ribs, life-size plans. 22" span. CHOICE: Spitfire, Vought-Sikorsky, Aircobra, Curtiss Dive Bomber. ANY 4 for $1 (postpaid, singly—by mail 35c).



CAPITOL Flying Models! Distinguished design, sturdy Multi-Stringer Construction. Big 36" wingspans, photographic plans. Choice: GRUMMAN Wildcat, N. A. MUSTANG, VOUGHT-SIKORSKY, CURTISS P-40F, SPITFIRE, Douglas DEVASTATOR $1.25 each (by mail add 20c).

Faithful replica of a this famous, small private flier (designed for ATOM). Semi-planked fuselage, balsa leading edge, silkspan tissue, wheels, detachable wings, decals, removable motor mount..... **$1.95** (By mail add 30c)

Solids

Wide selection of kits for completion of handsome SCALE PIECE Solid Models and Gliders. This is a partial list. Limited by space—we have the MODEL YOU WANT!

GIANT SIZE of a Army twin-engine design. This is an accurate 1" ea. all-over version from original plans! Standard kit includes cut-to-outline shape wings, fuselage, rudders, stabilizers. Leading and trailing edges tapered where needed..... **$2.00**

Famous British Fighter, Barkard's deluxe, super-detailed GIANT SIZE Solid model with blue-print construction plans. Cut-to-outline shape parts, full outlines, etc. ALSO: Boeing STM-2; Curtiss P-40; GLOSTER Gauntlet; Grumman FIF-2; Messerschmitt; Curtiss Hawk; Airacobra; Hurricane..... **$1.50**

IDENTIFICATION MODELS, authentic in every detail, officially approved by Navy Department for this series. Choice of COMET and MESSOW flings.

Choice of best-performing gliders available to model builders who have outgrown flying activities or are anxious to discover many practical knowledges of visiting the thermals.

CONDOR—2 foot, efficient sport, flies on hand launch or tow..... **$1.00**

SAILPLANE—50", Class 'D', three sizes for on floor or model..... **$1.25**

DON'T WASTE

All modellers are now convinced that essential war needs, priorities and 'materiel' shortages have reduced supplies and availability of many items. A large number have already disappeared from dealer's shelves! Enterprising producers (Modellers, designers, manufacturers) are developing ALTERNATES! Ingenious builders are developing 'brain children' of their own to meet emergencies!

★

Until Victory is achieved—conservation MUST BE THE WATCHWORD! From the vast stock-on-hand we've always carried, we continue to fill needs while quantities remain! We, too, are working on suitable ALTERNATES! Build more carefully—it's more fun—but primarily because it is more patriotic!

NEW AIR-O-TRAINER

The new model with movable controls which teaches fundamentals of flying! Actual cockpit controls move ailerons, rudder and elevators exactly as in real plane! All parts finished including shaped joy stick, rudder pedals, etc. ILLUSTRATED FLYING GROUND COURSE IN EACH KIT..... **$1.50**

GAS ENGINES

SUPER ATOM

Lightest, most powerful 'A' engine developed. Bore and stroke ½". Displ. .097 cu. in. Weighs 2 ozs. with cuff and prop..... **$15.50**

ROGERS

RMC2 (Class 'B'..... **$ 9.75**
"29"..... **14.00**
"35"..... **14.50**

TRADE-INS

EXPERT REPAIRS

Top cash value allowance for old motor (regardless of condition) towards purchase of any new Brunsdier. Repairs and adjustments expertly completed using genuine factory replacement parts.

X-ACTO

Special Knife MODELLERS KNIVES

For clean, quick, precision cutting! Extra-slim, instantly changeable blades held with vise-like security. No. 1 for delicate cutting; No. 2 for heavy-duty work. Extra blades, choice of 3 shapes, each 10c.) Blade and holder, 50c.

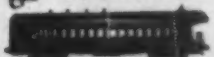
4 WAY WRENCH

75c

Sturdy, rust proof chromed. For spark plugs, nuts, etc.

HURLEMAN

Formerly $1 each. Can be taken apart for easy cleaning..... **50c**



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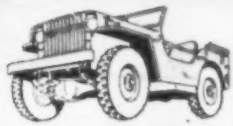

ARMY JEEP

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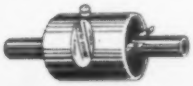

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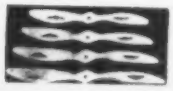

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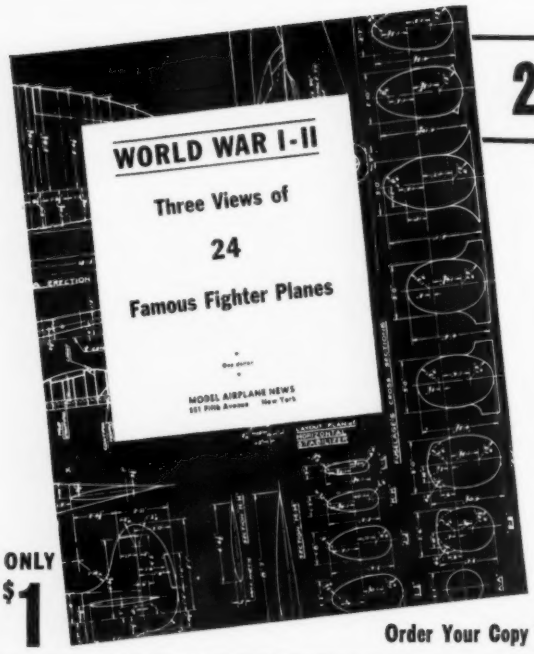

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offered for the group. The course as outlined would last for ten weeks and would be designed to familiarize NAA'ers in the area with different types of planes used by the United Nations and the Axis. Large wall charts and pocket manuals will be made available for individual members to study.

Lowell H. Swenson, chapter president, also outlined plans for organization of Junior Air Reserve flights in the Greater Twin Cities section. Air Youth activities such as model plane building have been strongly supported by the chapter for some time under the leadership of Walt Billett, committee chairman, and Lytton Calrow, co-chairman. Russell W. Nichols, acting director of the NAA Air Youth Division has assured the chapter of his full cooperation in the new program and it is expected rapid progress will be made.

J.A.R. Texts "In the Works"

Soon ready for distribution will be the official Air Youth texts on all phases of aviation, prepared in handy, worksheet form. These leaflets, created specially for the Junior Air Reserve, will be issued regularly after the first several dozen are off the presses.

A group of staff workers has been busy in New York City during the past several months assembling, editing, and preparing material for these Air Youth booklets. School teachers and activity leaders who have had the opportunity to inspect the material have been quick to say it is in very usable form for classroom and club work.

Richard S. Robbins of the Royal Canadian Air Force, who has been on leave to head up this NAA project, has announced that with the completion of the first series of bulletins and the setting up of an outline for successive leaflets, he will return to Canada and go on active duty with the R.C.A.F.

J.A.R. Hats Ready for Distribution

After an extensive wait for materials, several thousand Junior Air Reserve hats have arrived at headquarters for distribution. Already many have been sent out to Flights and Squadrons which have been waiting for them.

The hats are available in small, medium and large sizes. Information on head size and costs may be obtained from J.A.R. headquarters. The hats are made of khaki twill, and look much like regular Army overseas hats, except that the J.A.R. hats have a bright blue beading and the official Reserve emblem sewn on their left side at the front.

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Berlin Butcher

(Continued from page 23)

14,700 feet!

Here, then, was required power but in a very, very awkward form to the eye of a German airplane designer. Kurt Tank, not a little ruffled over the situation, surveyed B.M.W. Flugmotoren-werke's factories at Spandau, Basdorf and Vienna and the "shadow" factories of Henschel Flugmotorenwerke at Kassel-Altenbauna, Wiener-Neustadt and Rzeszow (Poland) as well as Klockner Flugmotorenbau's giant plant near Hamburg; all engaged in the production of B.M.W. engines. These "shadow" factories compare with our sub-contractor establishments in a manner similar to which Henry Ford is producing P&W R-2800 engines and Packard is building Rolls-Royce liquid-cooled engines.

Kurt Tank returned to his offices (Technical Director of Focke-Wulf Flugzeugbau G.m.b.H.) in Berlin and designed a single-seat fighter around the B.M.W. 801 engine . . . the Fw-190 is the result.

The airplane is entirely conventional in layout and Tank has done a magnificent job from specifications with which he had to work. The Fw-190 is, aerodynamically, one of the "cleanest" to make a recent appearance. Concentration of engine, fuel tanks, pilot, wing and landing gear mechanism in a highly localized area indicates that every possible consideration was given to good maneuverability with few large moments to be balanced out. The fuselage is extremely long giving very good longitudinal control.

A very obvious attempt has been made to lick the "disadvantage" of the radial engine's comparatively large frontal area with a very small, tight-fitting cowl. In order to hold this crossection to a minimum, it was necessary to route intake and exhaust manifolds between the cylinders as well as the ignition wiring, pro-

pellor controls, etc. This small frontal area also encloses the oil cooling system and has necessitated use of extremely tight baffling to insure an adequate flow of cooling air. This congestion made necessary a form of assisted cooling: a radial, multi-bladed fan mounted just inside the cowl nose. This fan is driven by a reduction drive from the propeller shaft, mounted on a radial retaining race.

Oil coolers are located in the leading edge of the nose ring and air is taken in through a small circumferential slot which forces the air in through the rear of the radiators, out the front and inward into the fan, thence through the engine. Additional cooling air is obtained from a large opening at the extremity of the propeller spinner.

The B.M.W. 801 engine is a direct fuel injection type using no carburetor and the metering fuel pumps are mounted radially on a casing inside of which is a face cam. These pumps force a fuel-air mixture of the correct proportion, automatically controlled, into the cylinders under pressure.

Most interesting feature of the powerplant is the large box just aft of the engine, containing the automatic servo unit controlling mixture, manifold pressure, fuel injection pressure, oil temperature regulation, etc., entirely automatically, thereby relieving the pilot of many duties which consume the greater part of his time and attention in more conventional designs.

Wing is all-metal design, built up on a structure of two main spars and chordwise ribs. Flush riveting is used throughout. Large span ailerons are used, equipped with servo combination trim and booster tabs of the "free floating" type projecting free of the trailing edge of the aileron structure. Slotted flaps are mounted on the under trailing edge of the wing, from the aileron inboard to the fuselage.

The landing gear has an exceptionally wide tread useful in operating from rough or muddy fields. In addition to its exceptional width it is located well forward of the wing leading edge which, coupled with the extreme fuselage length and aft location of the tail wheel, makes comparatively fast landings possible with little or no possibility of a nose-over. The gear retracts inward and upward into recesses located within the wing-to-fuselage fairing panels and are completely covered by hinged doors which close in after it. The doors are entirely mechanical in operation closing by action of the tires striking arms fitted to the doors and closing them in after retraction. The gear is hydraulically operated; the tail wheel, also retractable, operates in unison with the main gear.

Tail surfaces are full cantilever, elevators and rudder being fabric covered as are the ailerons. Rudder and elevators are also equipped with free-floating trim tabs. The vertical stabilizer has a peculiar kink in it near its top leading edge for which there seems little explanation other than some designer's belief in its use as a means of air flow control in the area.

The pilot is located well forward, as

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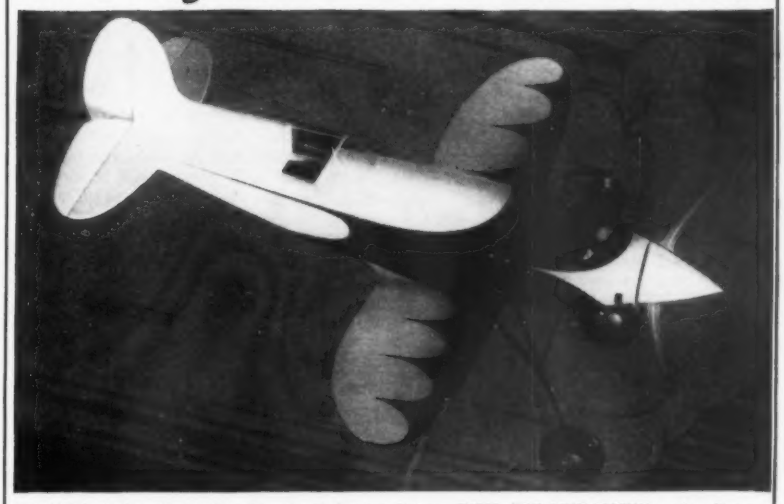

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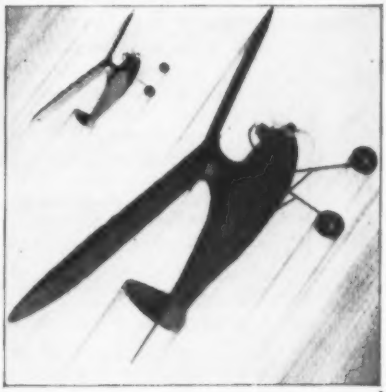
INTERCEPTORS UP



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previously mentioned, completely enclosed in a beautifully faired enclosure. The windshield has a built-in panel of 3-inch bullet resistant glass, a solid flat piece to eliminate vision distortion. The side panels are, therefore, flat. The sliding portion of the enclosure moves rearward on tracks on either side of the cockpit. The enclosure's rear portion is a single large piece of plastic acetate formed to contour. This seems poor design from a service viewpoint insofar as damage to the enclosure will necessitate replacement of the entire panel rather than a single small panel containing the damage.

A number of ingenious devices have been used, not found on any of the American or British designs. The pilot's control stick has a method of assisted control which utilizes springs mounted on cams on the three axes. As the pilot's stick force moves against the cam the spring is set in play which automatically assumes a large portion of the load, lessening the stick force required of the pilot. These forces must obviously become very high due to the elevator's long moment arm. In addition a device is used which the Americans and British might well copy: In the center of the control wheel is a button which releases a very positive spring. In a vertical or steep dive the pilot touches this button, releasing the spring which quickly operates the elevator tabs. The pull-out is then made at a pre-determined acceleration "g" thereby preventing his exceeding the design load factors of the wing.

The pilot is provided with moderate armor plating, his seat being backed by a horizontal and vertical plate of 8 mm. face-hardened rolled armor steel which gives protection from .30-calibre fire in direct hits and some protection from .50-calibre fire at angles of greater than 45°.

Both R.A.F. and Army Air Forces pilots who have met the Fw-190 have noticed a variety of armament. The original design utilized three 7.7 mm. machine-guns mounted in each wing panel just outboard of the landing gear trunnion points but this was shortly altered to use three 13.2 mm. Hotchkiss guns in each panel. Later reports, however, indicate use of a small shell-gun in each panel, quite probably the now popular German 15 mm. cannon. Reports that regulation 20 mm. cannon have been mounted on an Fw-190 are not verified insofar as the 20 mm. will normally use explosive shells, whereas the 15 mm. fires only armor-piercing ammunition and no explosive shells have been reported in battles thus far with the Fw-190.

The Luftwaffe's anticipation of a high top speed in the Fw-190 was doomed to disappointment as it is capable of little more than 370 miles per hour. It has a cruising speed of around 300 mph at which speed it has a range of approximately 500 miles, or a radius of action of only 250 miles. This also indicates an endurance of only 1½ hours, placing the Fw-190 in the short-range interceptor class.

Thus, in spite of the promise of the Focke-Wulf Fw-190, it seems to have fallen far short of expectations and has not exceeded the familiar Messerschmitt Me-109 in most respects. It has a wingspan of 37 feet and is 28 feet 11 inches long. It stands 11 ft. 2 in. high, has a wing area of 194 square feet. These dimensions are very similar to those of the Me-109 indicating that, since the Fw-190 flies no faster than the Me-109, yet has some 560 additional horsepower available, perhaps this latter has been put into a high rate of climb for interceptor duties. And if it is true that the Luftwaffe is now in production as an interceptor-type airplane, is it not safe to assume that the Nazis are now preparing for DEFENSIVE action against the bombers of the combined Royal Air Force-Army Air Forces. And, further, can we not safely assume that the air battle in Europe is now swinging in favor of the Allies?

Pilots of both the R.A.F. and the A.A.F., who have met the Fw-190 in aerial battle, have not been impressed with its fighting qualities and numbers of the new German fighters have been downed. Squadron Leader H. Allen Farquharr, who downed two Fw-190's on a sweep with a Spitfire squadron, reported: "We had no trouble catching up with the airplane and easily out-maneuvered it in our Spitfires. The first one caught me from behind but I was out and on his back leaving him afire before I turned my attention to a second airplane. My ship received several hits which we later determined were only .50 calibre or thereabouts although one of my squadron received a shell hole. The enemy came apart quite easily under my fire and we downed three and damaged the other before turning about."

On August 21st a squadron of eleven United States Army Air Forces Boeing Flying Fortresses was attacked by 20 to 25 Frocke-Wulf Fw-190 fighters over the English Channel; the Fortresses were returning to France for a visit immediately following the Dieppe holocaust and were engaged by the FW-190's in a pitched aerial battle for 20 minutes. The fighters were driven off after six of them had been downed by the gunners aboard the Boeing B-17's! Only one of the Fortresses was damaged and it returned safely to its base.

From these reports it can be gathered that the Focke-Wulf Fw-190 has no superior fighting qualities over its predecessors and certainly none over Allied fighters which it has met. It is to be

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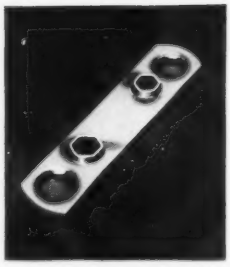

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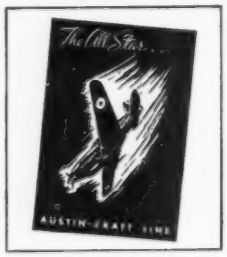

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noted with interest that the Boeing B-17 bombers mount only .50-calibre guns in the turrets (nose, tail, upper and lower fulesage) and it was this comparatively light fire-power that destroyed the attack of the Fw-190 fleet. Thus, the Luftwaffe has a new fighter which is of a pleasing appearance and fitted out with several highly interesting engineering gadgets, but it is no "great shakes" as an offensive aerial war weapon. Obviously the type is in quantity production but until Germany produces something far, far better than the Fw-190, the Allies need not fear the Luftwaffe's "new war weapon."

VICTORY

Air Ways

(Continued from page 26)

racy appearance, is very fast yet stable.

Witby's propeller is unique but gives excellent results. In the glide the blades fold back against the fuselage. The wire parts are made of 3/32" drill rod and can be bent to any desired pitch; if it is found that the pitch is too great after one or two test flights the trouble can be remedied by bending the blades slightly to the desired angle.

Mr. Davis' report follows:

A contrast in model contests during July gave Midwest model builders two outstanding events, a regulation A.M.A. contest conducted by the *Chicago Times* and a "wildcat publicity stunt" arranged by the *Chicago Herald American*. The latter is the former local sponsor of the Junior Birdmen.

The first of these meets clearly demonstrated the orthodox manner in which Academy-sanctioned contests are conducted, with strict adherence to rules and procedure. By this method all contestants are given an equal opportunity to compete in their respective age and class groups. At the *Herald American* Junior Victory Contest, A. B and C classes competed together with no limitations as to weight and wing area, a 10-second motor run, three trial flights-one official, and one trial flight in rubber events by 11 a.m., gas events by 3 p.m. Lack of properly instructed timers limited contestants to one or two flights during the day.

The field was located at the base of a 100' hill at Dan Ryan's Picnic Grounds, with thousands of spectators close to the takeoff pits, making the task of decent launching difficult and dangerous. Down draft currents from the hill caused dozens of models to crack up, as well as result in the injury of several contestants.

The value of such wildcat contests is doubtful.

Featuring War Bonds as first place awards in the Gas Events and War Stamps for winners in the Outdoor Stick and Cabin Events, the Chicagoland Model Airplane Contest, July 26, 1942, was conducted by the *Chicago Times* and The Chicago Park District at the Model Flying Field. This big meet was scheduled to accommodate many builders who had planned to enter the Nationals this year.

Rubber model enthusiasm is definitely on the upgrade as was evidenced by the great number of entries in the Stick and Cabin Events. Melvin Melichar, 1351 E. 55th. St., Chicago, did the fans justice with his excellent exhibition and his 11:15.0 flight in the Junior Cabin Event, to place first. Bob Denton, Kenosha, Wis., tallied a first with an 11-minute flight over Vernon Walters of Aurora, Ill., who placed second with 6:55.8. Robert Hildebrand, Wilmette, Ill., led the Senior Cabin Event with 8:06.7 to nose out Joe Storcel, 2644 Pulaski Rd., Chicago, who placed a close second.

Competition in the gas events was keen in spots, but Milton (consistent) Burley and his "Swoose" placed first in B & C Gas to claim two $25 War Bonds, while Ken Witby, "Fondy Aeronuts," Fond du Lac, Wis., carried a second in B Open and a third in A Gas Open for $20 in War Stamps. Ken's ship, a diamond shaped "fuse" with a high wing mount, was equipped with an original design adjustable-pitch folding prop, for faster climbing.

The Milwaukee Model Club came en masse to compete in all events; Frank Schnagl, Bob Wood, Bob Abrech, Ray Zehnke, Happy Blink, Dick Swendsen, Lloyd Mathai, Francis Stern, Glen Herzer, Fred West, Art Zuncher, and Eddy Bortz. It might be well to contact these lads and get the secret of their ultra-high gloss finishes and smooth covering techniques.

Fastest growing model club in town is the recently organized "Skyscraper" Gas Model Club, Henry Duminie, President; Curtis Hampton, Vice President, and Winston Z. Arrington, Secretary. The

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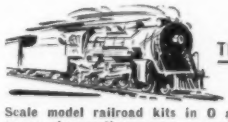

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Skyscrapers meet regularly at Washington Park every other Friday.

Picture 7 shows Everett Powers and his Atom powered Fokker D-7 scale gas model which he entered and flew at the first meet held in the East this year under the new A.M.A. rules. If this is the effect new rules have upon the design of airplanes we feel they are a great improvement, for model builders certainly will receive a more complete training and contests will provide more interesting ships and flights when scale or semi-scale models are encouraged rather than the "freak" contest models common in past years. Models of this type really teach model builders something about big ships, which, after all, is their ultimate goal.

Picture 8 shows Jack Burke's Meteor, built from plans in MODEL AIRPLANE NEWS. He says:

"The model was completed on the 31st of March, to be flown (and shown off) at an April Fool's Club contest held by the East Bay Aeroneers of Oakland, Cal.

"The complete model was a truly beautiful thing to look at, but thoroughly shocked me when placed on the scales. My Meteor weighed 30 ounces, ready to fly. All I can say is Mr. Taibi must hide a Super-Cyclone somewhere if his plane flies 60 m.p.h., for mine with the motor wide open would only power glide.

"Until time when I can afford a '23,' '29' or Bantam motor, which must truly be a lot hotter than my 'Micro,' I will have to concentrate on finish contests alone, as far as the Meteor is concerned. Truly the Meteor is a beautiful job and I have nothing against it at all except that mine was underpowered. Wish me luck."

(Editor's Note: The original plane weighed 22 oz. and the nose was rounded considerably more than the plane in the picture, thereby reducing head resistance —and it actually flew 60 m.p.h. Possibly the difference in weight, shape of the nose, and power of the engine explains the difference in performance. Sometimes the tail setting will change the speed of a ship. For speed the stabilizer should be neutral and the wing angle of incidence from 2 to 2½ degrees in high wing planes.

PFC Robert M. Bartlett, Co. A, 16th Med. Regt., Fort Devens, Mass., sends us an interesting picture, No. 10. It is a man-carrying glider built by the gas model club of which Bob was a member during the winter of 1940-1941. Soon after it was started Bob entered the Army but the other members finished and flew it for two months before they discovered that after a couple of rough, hard landings the fuselage wasn't strong enough. So they tore it down and rebuilt it during the summer and flew it more than 200 times before the gang really broke up. Sixteen of the fellows had a lot of fun learning to fly it. The moral is: when gas model builders become tired of building gas jobs they might design and build their own gliders; after all, Uncle Sam is going to need pilots and this is an excellent first step in the right direction.

Edward Trozal of 311 Elizabeth St., Dunmore, Pa., is a gas model builder with a liking for originality. He sends us picture 11, showing a built up model of a Northrup Flying Wing that he recently constructed. It required a month to complete and cost approximately $2. The structure is built around a main center spar and is covered with 1/32" sheet balsa. There are housings at the rudder and aileron adjustments on the wing which can be removed. All model surfaces can be operated from the cockpit. The entire surface was covered with thin tissue and doped. The plane has a wingspan of 23". It is certainly unique and should form the basis of some interesting gliding experience; much can be learned from building and gliding models of this type and carrying on a series of gliding experiments.

David Melluish of 1209 S. Howard Ave., Tampa, Fla., says he has been experimenting with a flying fuselage or airfoil fuselage design. It has a 48" wingspan and is powered with an Ohlsson "23." Despite the large wing area and low power the model climbs well and the glide is above the average. Melluish is shown with his model in picture 15.

John Cochrane, Secretary of the New Orleans Aero Club of 4506 Freret St., New Orleans, La., sends us the following report of a recent contest:

"Despite bad weather on the original date of the contest, the Gulf States Model Air Meet was successfully held two weeks later. It was one of the largest ever held in this section, drawing contestants from all Southeastern states. The meet was held on a Naval Training Field which boasted a half mile square asphalt mat. This was ideal for takeoffs, the only disadvantage of the field being a swamp nearby.

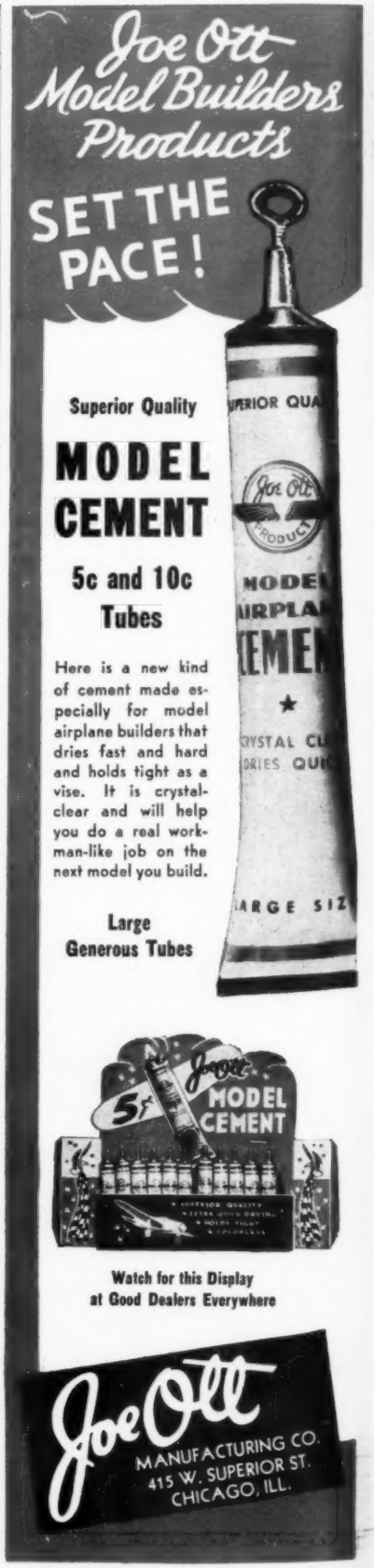
"Due to cloudy weather all day and rain at 4:00 p.m. there were no thermals. Only one ship was lost and we might here state that anyone in the New Orleans area finding this ship will please get in touch with Mr. Jack Thames of Mod-Kraff. The ship belonged to Bill Smisson of Pensacola, Fla. The ship was covered with red silk and powered with a Forster '29.' It was a beautiful flight on which it was lost but a 15 sec. motor run was responsible, not a thermal; it quartered into the wind and headed straight for the swamp. The ship was a Berkley American Ace.

"Now for the contest results:

Class A Gas

Winner	Ratio
Lamar Dennis	7-16/28
Melvin Jung	7-11/26
Jose Martinez	5-20/23
Lamar Dennis	9-10/29
Eddie O'Donnell	6-20/23
Melvin Jung	6-3/10
John Cochrane (Senior)	13-10/11
Thomas McLaughlin (Open)	12-12/27
Wasley Powell	12-4/15
Jack Thames	9

"All age groups were combined except for first place in Class C. In Class C first prize in Senior was a $25 War Bond and the William Helis Perpetual Trophy. In the Open Division first prize was a $25 War Bond and the Mod-Kraff Perpetual Trophy. In all other events for gas the prizes were: First, $25 Bond; second, $12.50 War Stamps; third, $7.50 War



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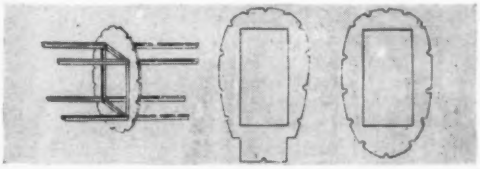

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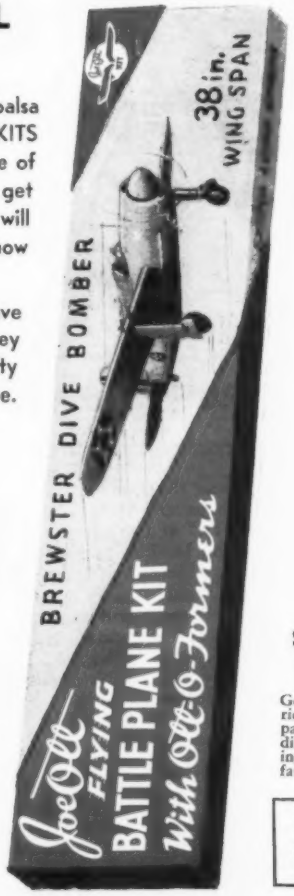

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"A unique event was the Scale Model Contest. These were built to any scale but had to be given up for use in National Defense. Winners were:

Paul Stuart—$50 Bond.
Lamar Dennis—$25 Bond.
M. D. King, $15 Stamps.
Jimmie Dennis—$10 Stamps.
M. D. King—$7 Stamps.
M. D. King—$5 Stamps.
Melvin Jung—$4 Stamps.
Lamar Dennis—$3 Stamps.
Patsy Cochrane—$2 Stamps.
Lamar Dennis—$1 Stamps.

"The grand winner of the meet was Lamar Dennis with a total of 73 points. He was awarded the Exchange Club Trophy and a $50 War Bond. Dennis was beyond doubt the outstanding contestant of the meet. His total winnings were $128 and the Exchange Club Trophy.

"During lunch period the contestants were addressed by Lt. Com. Priestman of the United States Navy.

"Now that the big contests are over for a while, we have gone back to our old contests for club members every two weeks."

Picture 13 shows a few of the club members during a Sunday flying session on the local golf course.

We learn that a few of our readers unfortunately got the impression that we are very much against U-control or tether models. We are at a loss to know where they got this impression, for we feel that this type of ship provides a valuable prelude not only in model building and designing but in actually flying it. It helps to give the operator "the feel of the air" and to provide a valuable foundation for future full scale flight experience. MODEL AIRPLANE NEWS has already published plans for a U-Control model; more will appear in the future.

An ardent exponent of this type of flying is Russ Weber, of Chicago. Picture 14 shows him with his rather large stock of U-control jobs that he carries to all contests. He has won first place in every contest he entered.

California

Don Foote, publicity director of the East Bay Aeroneers Association, 816-56 St., Oakland, sends us the following news from the West Coast:

"The East Bay Aeroneers Association of Oakland, Calif., held its semi-annual election of officers on the last Monday in July. Russ Watkins was elected President for the next six-month period while Dick Diehl was elected Vice-President. Russ Basye will hold down the office of Secretary-Treasurer and Nate Magnesi the office of Sergeant-at-Arms.

"With so many of our fellows going into the armed forces and now on fronts all over the world, it has been a difficult job to keep things going. Yet, in these critical times we are stronger than we have ever been and boast a membership of close to one hundred fliers.

"With the rubber situation the way it is, it is no longer possible for our members to travel several hundred miles to attend contests. Consequently, we must put on a great many local activities to keep things going. We have been able to interest a lot of older men and women in flying, and they keep things going for the kids.

"This is an ideal situation. For, on Sunday, Pop loads Ma, Son, a few ships, and a lunch in the car and drives out to the field early. We fly until the wind comes up, then retire to the shady trees and have a picnic lunch and repair ships. In the evening when the wind goes down, we drag out the ships again and fly until dark. Some of us haven't missed a Sunday at the field for over a year.

"Movies taken at the field serve to stimulate interest at our meetings, and talks on aerodynamics help the youngsters to improve their designs.

"Because of our many activities, we are actually growing by leaps and bounds when a great many of the clubs in the country are folding up. There is more interest in aviation now than there ever has been, and every club in the country should be growing as we are."

Readers Discussion Corner

Many West Coast fans and model clubs feel the A.M.A. rules are either not popular or do not fill their particular requirements. Consequently, many have made up their own rules under which they have been operating for some time. Comments on this situation appeared in September "Air Ways."

A number of letters have been received from West Coast fans presenting their side of the question and presenting their ideas. Some may be in accord with reason and others not; however, we will let the readers judge. Following are some of the letters.

If you choose to comment upon them write and your answers will be printed in our "Aviation Forum."

Following is a letter from Don Foote:

"In the September, 1942, issue of MODEL AIRPLANE NEWS, you state that there appears to be a revolution on the West Coast because we are not using the 1942 A.M.A. rules and have adopted the 1942 Pacific Coast Gas Model Rules instead. You will recall that the 1942 Pacific Coast Rules are as follows:

1941 A.M.A. rules with these additions:

1—All ships must be equipped with a dethermalizer.
2—Longest flight to be 10 minutes, or less if the contest director so rules. A 10-minute flight or over is recorded as a 10-minute flight.
3—Contestant allowed to guide his ship on take-off as long as he does not take a step forward. No hand launching.

"You ask why the fellows on the Pacific Coast do not use MODEL AIRPLANE NEWS as a means for expressing their opinions, and as Publicity Director of the East Bay Aeroneers Association of Oakland, Calif., I have been asked to express the views of this organization.

"In the first place, we feel that the 1942 A.M.A. rules are not the result of war conditions. These rules are the result of the dictator methods of a few men at the head of the A.M.A. and absolutely disregard the democratic wants and needs of the flyers themselves.

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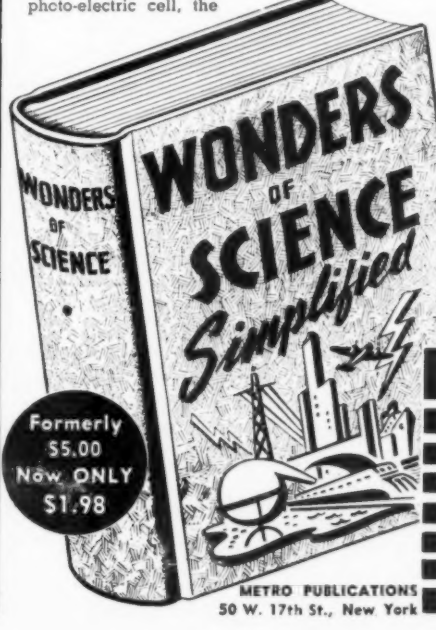

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"The discussion of the rules started over a year ago. Finally, in Model Aviation, the official A.M.A. magazine, Mr. Angus, head of the rules committee, wrote a letter containing his views as to what the rules should be. In this letter Mr. Angus literally laid down the laws to the modelers of the country. *This letter appeared long before our country was at war.* In spite of the protests from modelers all over the country these rules were adopted by the A.M.A. in absolute disregard to the wants and needs of the flyers themselves. Now, the fact *that our country is at war is being used as an excuse for the adoption of these rules.*

"The leader members of this locality intended to support the A.M.A. no matter what the new rules would be. Yet, when the 1942 A. M. A. rules were announced as passed over the strong protests of the flyers, there arose a spontaneous and individual revolution against all rules and order whatsoever. It became evident that the flyers were heading for trouble. We are in a combat zone, and several cases of interference with our spotting system occurred. If something hadn't been done immediately, we would have been grounded for the duration.

"Therefore, as many flyers as could possibly be contacted were asked about rules. Through this democratic process the 1942 Pacific Gas Model Rules were developed. *These rules have solved our problem and saved us from being grounded.* There have been no more interferences with our spotting system, and the flyers themselves are absolutely sold on these rules. There has been, amongst all the flyers, only one single man who has objected to the rules.

"Let us examine just a few of the A.M. A. rules to see why the flyers are against them. First, the 4 minute rule. For years the big contest in Model Aviation has been the duration contest. This is really tops in competition. Now, our dictators proclaim that we shall have no more duration contests, but shall substitute a precision contest and see just how close to 4 minute flights we can come. Does this 4 minute precision contest show up the better plane? We don't think so. The excuse for this rule is that the ships must not be allowed to make out-of-sight flights. Yet, there is no law requiring the ship to be equipped with a mechanism to make it impossible for the ship to get away. And, the A.M.A. has always insisted that we refrain from flying that close to trouble.

"Compare this rule with our rules as developed by the flyers themselves. Dethermalizers are compulsory. As a result, we have developed very practical and reliable dethermalizers. The maximum recorded flight is 10 minutes. This gives the flyer the thrill of catching a thermal, without the danger of interfering with our defense organization or the fear of losing a ship.

"Examine the 'no cross-section' rule of the A.M.A. What is the reason for the elimination of the cross-section rule? The flyers wanted something that would tend to decrease out-of-sight flights. Yet, here is a rule that will increase them. The excuse given for this rule is that it will help develop flying wings. Yet, under the old rule of L 2/100 the fuselage cross-section was governed by the length of the fuselage. A flying wing has no fuselage. There is no 'L,' therefore there does not have to be any cross-section, and the flying wing is perfectly legal under the old rules. No, this rule was not made for the benefit of the flyer. It was made for the benefit of the contest director who is too lazy to measure up a fuselage.

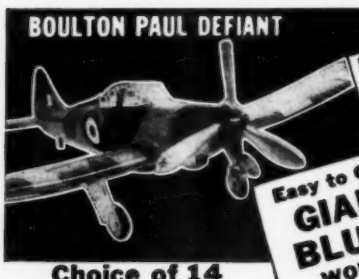
"Another rule made for the benefit of the lazy contest director is the 'optional launching' rule which makes it unnecessary for the contest director to furnish take-off platforms.

"And, cutting the motor run down to 15 seconds certainly shows a complete lack of understanding of the flyer's heart. Those little motors are beautiful to us. To hear that beautiful piece of precision engineering bark out its defiance to the world as it pulls that pretty ship skyward is the biggest thrill of all. No, don't ask us to cut our motor run down to 15 seconds.

"We want and need a national organization. But, the A.M.A. has failed us. We were forced into this action because a few dictators have seized control of our national organization. We were forced to make our own rules to save our hobby from the destruction that the dictators, through their short-sightedness, caused. We do not like to take such action, but there has been trouble over 'taxation without representation' before. We hope to continue to work with A.M.A. until we get a more democratic set-up of, by, and for the modelers."

Your Editor wishes to ask a few questions of the model builders:

1. What is a dethermalizer, when does it dethermalize and how much? Isn't there a lot of room for argument here? 2. Is it wise to make a rule when a dethermalizer must be used? 3. Can a model builder not use a dethermalizer if he feels it wise to? 4. Is it not best to have as few rules and limitations as possible? 5. How and why was the crossec-



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tion rule first initiated? 6. Was this to control the possible length of a rubber motor relative to the drag induced by the crossection? Why should it be used on a gas model? 7. When does a model look like an airplane? 8. What particular features do airplanes have? 9. How will you figure the fuselage crossection of a flying wing? 10. Is it the purpose of the rules to encourage model builders to build gas models like large planes; if so, why is the crossection rule necessary? 11. What is the objection to a maximum 10 min. flight? 12. How can contest directors determine an inexpert flier from an expert one when the 4 min. maximum flying rule is used? 13. Why not allow the model builder to decide when he wishes to bring his model down and by what means?

Coming Events

October 16—Creedmore, N. Y.—1st annual L. I. Rubber Model Championships. Sanctioned by A.M.A. Write William Fletcher, 87-08 Grand Avenue, Elmhurst, N. Y., for full details.

VICTORY

Flash News

(Continued from page 2)

the fighting decks of ships like the Saratoga, Yorktown or Enterprise, for they are converted Great Lakes steamers which will be used for training purposes only. The first is the old side-wheeler, the Seeandbee, former queen of the Great Lakes passenger service; the only side-wheel paddled aircraft carrier in the world. The Greater Buffalo, one of the largest fresh-water ships afloat, is now in the process of conversion. The two carriers will be used in connection with the Navy pilot training program at the Great Lakes Naval Training Station.

An Avro Lancaster, giant R.A.F. four-engine bomber, is now in this country on a display tour for benefit of aircraft designers, builders and Army pilots. The huge ship has done innumerable forays over Hunland, wreaked considerable havoc, and it will be regarded with interest. Carrying an eight-ton load, it is larger than our Flying Fortress or Consolidated types and it is rumored that it may be put in production.

The Duke of Kent, youngest brother of King George VI of England, has been killed in the crash of a giant Short Sunderland flyingboat in Northern Scotland. The Duke, enroute to Iceland on an official mission, was part of a crew of nine handling the Sunderland which has a range of 2,500 miles and top speed of 210 mph. The accident was not believed to have been due to enemy aerial activity. The Duke of Kent was a veteran flier, had flown hundreds of hours in combat planes as well as other types since war was declared. He was an Air Commodore on the staff of the Inspector General of the Royal Air Force and was considered an excellent engineer as well as pilot. He recently became the first member of British royalty to fly the Atlantic by making a secret flight to Canada in July, 1941, in a Consolidated Liberator bomber to inspect empire training schools and establishment.

Charles Howard, owner of the immortal racehorse Seabiscuit, has been commissioned a Captain in the Army Air Forces and is now on duty with the West Coast Army Air Force Training Center at Santa Ana, Calif.

Consolidated PBY flyingboats are now being used on torpedo missions in the Pacific, it was recently revealed by Lieut. (j.g.) Gaylord Propst, who piloted one of them in the discovery of a large Japanese fleet of cruisers, destroyers and transports off Midway. One of a squadron of four, Propst's plane was fitted with torpedoes and sent on a routine patrol during which the Jap ships were sighted suddenly through a clearing in the clouds. The PBY's swooped low, raced along the water's edge straight for the enemy's ships and dropped their torpedoes into the water, zooming clear. A seaplane fighter attacked him shortly afterward and he was not able to see the results of the explosions which followed. Although of an obsolescent type, the PBY's (one of them discovered the "Bismarck") are yet doing valuable work in this war and this new tactical installation makes them of even greater value.

An index to the aircraft industry's production effort is gained from a recent

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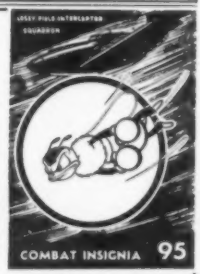

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report of the Aeronautical Chamber of Commerce which states that since the outbreak of war on September 3, 1939, the American aircraft industry has produced a total of $5,250,000,000 worth of airplanes, engines and propellers. In comparison, this means that *eight* times as much warplane equipment has been turned out in the last three years as in the *ten* years preceding. Plant space has increased 25%, employment 50%. Man-hours of work has jumped 75% since Pearl Harbor alone which means simply that we are working harder, more men are working, more planes are being built each 24 hours than at any time in our history. Engines, too, are being rolled out at an astonishing rate, the total horsepower produced being boosted 75%.

Stewart Field, the "Wings of West Point," at Newbergh, New York, was recently dedicated as a training center. It is the largest airport in the United States.

The Marine Corps has opened the ranks of its glider pilots to enlisted men. Any first-class private under 32 years of age with at least 8 months of service is now eligible for glider training.

North American Aviation's recent "Autograph-a-Bomber" campaign has caught on with a bang and War Savings Bond Buyers have besieged the firm. Into each B-25 bomber now goes a scroll with a list of the names of Bond Buyers who wish to be present in spirit as the planes roar over Tokyo or Berlin some day.

Glenn L. Martin envisions a giant aviation "police force" which would serve as a powerful weapon for the preservation of peace and discouragement of future re-kindling of wars. The noted aircraft designer says: "Production of fighting aircraft must not cease when the peace is signed for we'll need the ever-present threat of sudden air attack to keep would-be transgressor nations in line."

Jackie Coogan, famed to movie-goers as "The Kid" of many years back, has been graduated with the rank of staff sergeant from the Army Air Forces glider pilot training school at Twentynine Palms, California.

A lucky toe-hold saved the life of Sergeant G. C. Hollister, aerial gunner aboard a Flying Fortress operating over New Guinea. Hollister was operating the bottom gun turret of a B-17 during an attack by several Japanese Zero fighters when one of the Zeros whipped in close and a cannon shell blew off the gun turret door. The sergeant fell back outward and hung in space 25,000 feet over the Pacific held only by his toes which had lodged behind a bar connecting the two guns of the turret. Through his interphone, he told the others of his plight and was promptly rescued.

Staff Sergeant Paul Otto Young of the United States Army states that American combat planes are better than those of the Nazis and he most assuredly should know for he received his commission in the Luftwaffe in 1937 and flew as a member of a German fighter squadron for more than a year before "he saw how things were going and didn't like it." He is especially impressed by the rugged construction and durability of American types and says: "The German machines are worn out in no time." He is spoiling for action in Europe for he says: "I have a little bet with a couple of men in the Luftwaffe that we'll meet in combat in France."

VICTORY

Modeling Your Future in Aviation

(Continued from page 14)

cameras and radio equipment. These are used in fighting areas and on longer flights than would be possible with lighter craft. Though unarmed it has considerable speed. The cabin is glass enclosed, affording clear broad vision. The belly of the ship is spacious with openings below the wing for observation and making photographs of objectives.

Conditions influencing observation in Naval warfare are quite different: limited space for takeoff, landing and storing of aircraft on cruisers and battleships are the chief influencing factors. These observation planes are compact yet have capacity for extended flight. They are built to withstand the force of catapulting from a warship's deck and also are capable of landing upon water, to be hoisted aboard ship again at the end of the flight.

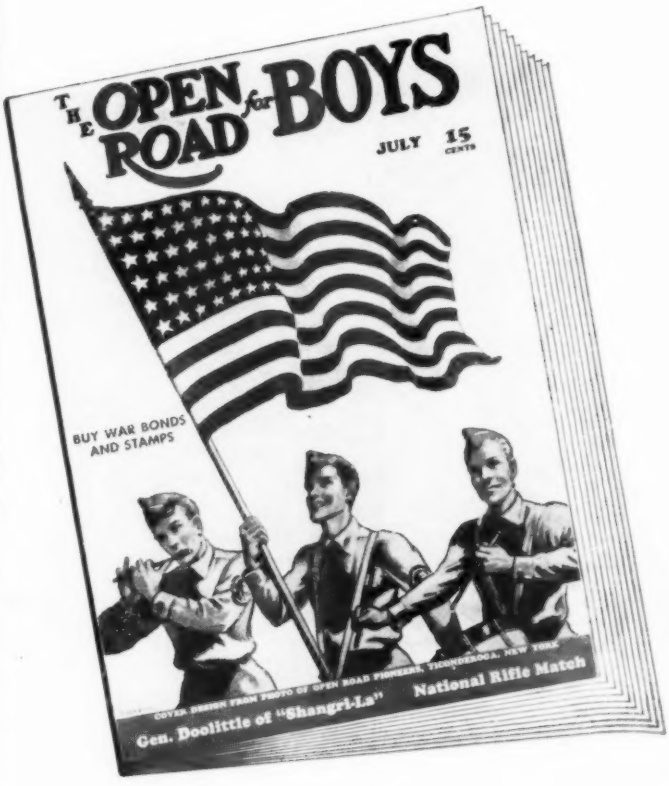
Fig. 30 shows a scouting plane carried on scouting ships and heavy cruisers, disclosing how this problem has been solved. First of all, it is a biplane, the most compact and strongest type of airplane for a given wing area. It is equipped with slots for quick takeoff and slow landing. Its single float provides an excellent support on the catapult launching device, as well as a means of landing on water. It is a typical example of a plane in which speed has been sacrificed for other more important requirements.

Though this type of structure is compact and sturdy, it offers great head resistance and makes highspeed impossible. The highspeed of this type is approximately 160 mph.

Monoplanes are also used for reconnaissance planes but as yet have not proved themselves as reliable as the more compact biplane form.

Obviously these small ships are not suitable for long range work; this requires another type of work, typified by the Consolidated PBY patrol boats, fig. 40. Long range being the chief objective, we have a plane with broad wingspan and medium power capable of carrying a heavy load of fuel and flying great distances. Nearly all of its lifting capacity is taken up with fuel load though it is usually lightly armed with machine guns.

When performing some specific patrol duty such as scouting out and destroying U-boats, this plane is equipped to drop depth charges and light bombs, but cruising range is always of primary importance and bombloads carried are only sufficient to complete its mission successfully. An excellent example of the reconnaissance service rendered by this craft is in the Alaska campaign, where it is necessary to fly tremendous distances and remain over the target observing the enemy for a considerable length of time. Reports from these ships on observation



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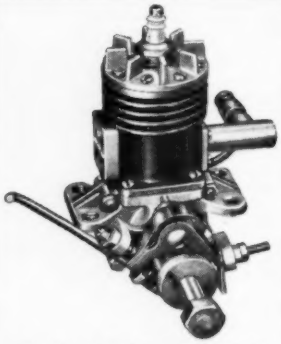

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duty have resulted in the sinking of many Japanese craft.

LIAISON: These planes gather and transport information to headquarters; a mission which requires landing and taking off from any spot available, usually not an airport. The outstanding performance characteristic required is low take-off and landing speeds. These ships are either very lightly armored or carry no guns whatsoever.

To obtain such performance the prime characteristics are sturdy construction, large wing area and medium or low power, and are usually of the high-wing type. Light commercial planes have been used effectively in the U.S. Army for liaison work, because they can get in and out of small rough fields. The latest U.S. Army liaison plane is a converted heavy sportplane, shown in fig. 33.

HEAVY SPORTPLANES: The chief purpose of the sportplane is to transport passengers from one place to another. Speed is desirable but economy is essential, so the high speed of the military craft is sacrificed to reduce fuel consumption and cost of operation. Low landing and takeoff speeds are necessary for safety and comfort of the average novice pilot. Consequently sportplanes usually have light wing loading with comparatively low power and are very stable. Many modern sportplanes will practically fly themseves.

The most stable type is the high-wing plane, common among most sport jobs. In some cases low-wings are used because they are cheaper and simpler to build. This is reflected in low cost to the purchaser. Whether safety or economy is to be emphasized depends entirely upon the choice of the designer. Though high-wings give greater stability, stability is not so much less in the low-wing type that safety is impaired beyond reason in the hands of the average pilot. Heavy sportplanes usually are designed to carry 3 to 5 people; a Fairchild 24 of 175 hp., shown in fig. 38, is an excellent example.

LIGHT SPORTPLANES: The design of light sportplanes is essentially the same as heavy except they are smaller, less powerful, of shorter range and carry only 2 or 3 people. The prime objectives are speed and low initial and operating cost. High-wing planes of considerable wing area and low power are favored for this type. A typical example is the Taylorcraft shown in fig. 41. Some manufacturers put greater stress on safety, others on simplicity of structure. The latter policy usually results in low-wing planes; such as the Ercoupe shown in fig. 42.

The majority of low sportplanes are powered by only one engine, ranging from 50 to 100 hp. Construction is simple and a high degree of expensive streamlining is absent. Because of the low power and stresses developed compared to highspeed types, the structure is light and reduced to simplest terms to encourage mass production. Usually in this type, engineers have followed the policy of modifying and simplifying construction to reduce cost rather than carrying on extensive research to develop more efficient aerodynamic characteristics.

Careful study of the purpose, performance required and structures of the various types of ships discussed here will give a clear conception of the difference between them, making it possible for an observer to instantly name the type and make of ship when it flies overhead. When it is recognized that the mission or purpose of any plane is reflected in its design and structure little trouble will be encountered in determining the exact purpose of any particular type, even though it is one with which you are not familiar.

Building the North American B-25 Bomber

If the reader has constructed the bird glider and the 2 other silhouette military planes given in this series constructing this little plane will be quite simple. Building constructions are basically the same as in the other construction projects; however a few more advanced operations are included.

Like the bird glider it is constructed of flat sheets of balsa or white pine cut out to the proper outlines and assembled with cement, except in the case of the wing. This is built up, composed of a thin wood sheet with ribs cemented to the underside at intervals along its span, thereby giving the proper curve, or camber, to the lifting surfaces. When the wooden framework is assembled the underside is then covered with paper.

Building procedure is as follows:

Cut out the fuselage from 3/16" medium hard balsa sheet or 1/8" pine, carefully notching it for wing and stabilizer. Then shape the 2 motor nacelles from 1/16" sheet, as indicated on the plans. Stabilizer and fin are cut from 1/16" very light balsa stock. If made of pine, cut lightening holes, leaving only enough wood for strength. Tissue paper is then cemented over the surfaces.

When all surfaces and fuselage are cut, round the edges gently and smooth the surface of each part with sandpaper.

In constructing the wing first cut out the balsa sheet to the proper wing shape given on the plans. Then cut 6 ribs: 4 from 1/8" stock and 2 from 3/16" balsa. Glue these in place as shown on the plans, the wide ribs being cemented close together at the center of the wing. The balsa or pine wing sheet may be held down tight to the ribs with pins or weights inserted at the leading and trailing edges.

When the ribs are firmly in place the cement must be allowed to dry thoroughly before it is disturbed. When dry cut the wing in half at the center and bevel the inner face of each center rib to give the wing correct dihedral; the degree or bevel is indicated on the drawing. This is simply done by rubbing the surfaces to be sanded on a piece of medium grade sandpaper laid flat on the table.

When properly formed, glue the wing together at the center, keeping the tips raised the correct amount indicated on the plans, while the cement is drying.

Do not disturb the wing for at least 3/4 hr. Then the underside may be covered with tissue paper. This is a delicate operation and a definite procedure should be carefully followed to insure good re-

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sults. Half of the wing will be covered at a time.

First cut out a sheet of tissue slightly larger than the wing-half, leaving a border of about 3/16" all around. Apply cement to the center rib and tack down the paper to it, drawing the paper tight from the wing tip. Next apply cement to the 2nd rib, drawing the paper toward the tip and pressing it down on the rib. Fasten it to the 3rd rib in like manner.

Do not stretch the paper chordwise, that is, from leading to trailing edge; always stretch it from center to tip.

Next draw the end of the paper covering up around the tip of the wing, cementing it in place around its upper edge. Then apply cement to the upper side of the leading and trailing edges, drawing the loose edges of the paper up around the edges and cementing it to the wing. The paper covering may be tightened by spraying it with water, using an atomizer; do not soak the paper but merely dampen it. Then allow it to dry while the wing rests in a level position supported at the ends.

Start assembly by inserting the wing in the fuselage and cementing it in place. Pins may be used to hold it steady while drying. Next cement the stabilizer to the rear of the fuselage as indicated, also the small section of the body directly over the stabilizer. To this fasten the fin in an upright position, using pins to hold it rigidly.

Landing gear struts are made from .030 wire bent to the shape shown on the drawing. When wheels have been slipped over the axle bend up the axle to hold the wheels in place. The U formed by the straight ends of the nose-wheel gear fit up around the nose and are held firmly with cement.

Before assembling the engine nacelles to the wing fasten the rear landing gear to them, one to the inner side of each engine nacelle. These are held firmly by a weight against the nacelle and cemented in place. Cut out a small sheet of paper and press the paper over the wire so that it will be fastened firmly to the nacelle. If desired small wood strips may be notched to fit over the landing gear wire where it joins the nacelles, and then cemented in place.

When the joints are dry cement the nacelles to the underside of the center rib of each half-wing or pinion. Small pieces of the nacelle are cemented to the top of the wing to give the nacelles correct outline.

All that remains now is to insert a small weight in the nose and to cement the side nose and fuselage pieces in place. The correct weight may be determined by placing the loose parts on the nose and resting the side of the fuselage on the finger with the wing vertical to determine the correct balance. The point of balance should be about 1" back of the wing leading edge.

When the weight and nose pieces are in place and all cemented joints are thoroughly dry you may proceed to decorate your plane. To fill the pores of the wood cover all surfaces with a coat of clear dope. When dry draw in the black lines indicating cabin and other structural parts of the ship. The plane may be decorated with color if desired; lacquer is recommended for this purpose.

Now your silhouette military glider is ready to fly. Follow the same procedure as indicated in article 3; we advise reading over the instructions carefully before attempting to fly your ship. Being larger than gliders given previously and having a light, efficient cambered wing, this little glider should give superior performance, appearing very realistic in flight.

VICTORY

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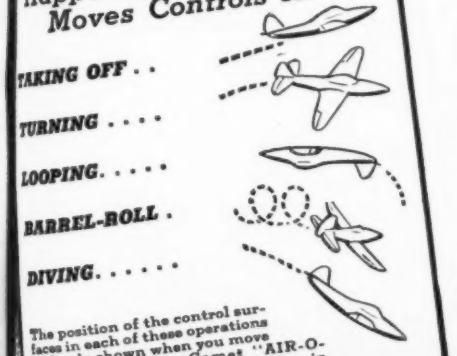

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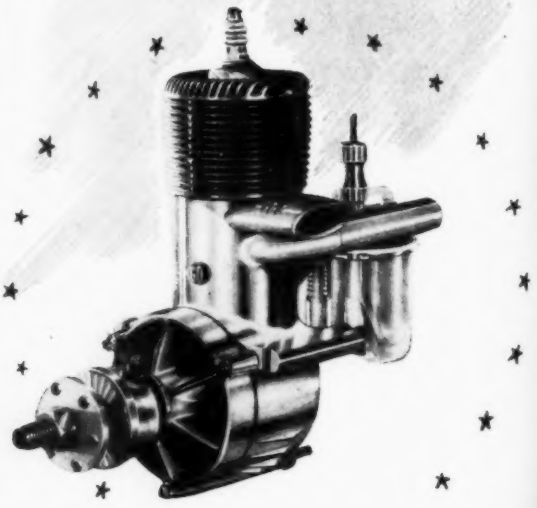

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